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House Lighting

Electrical Engineering

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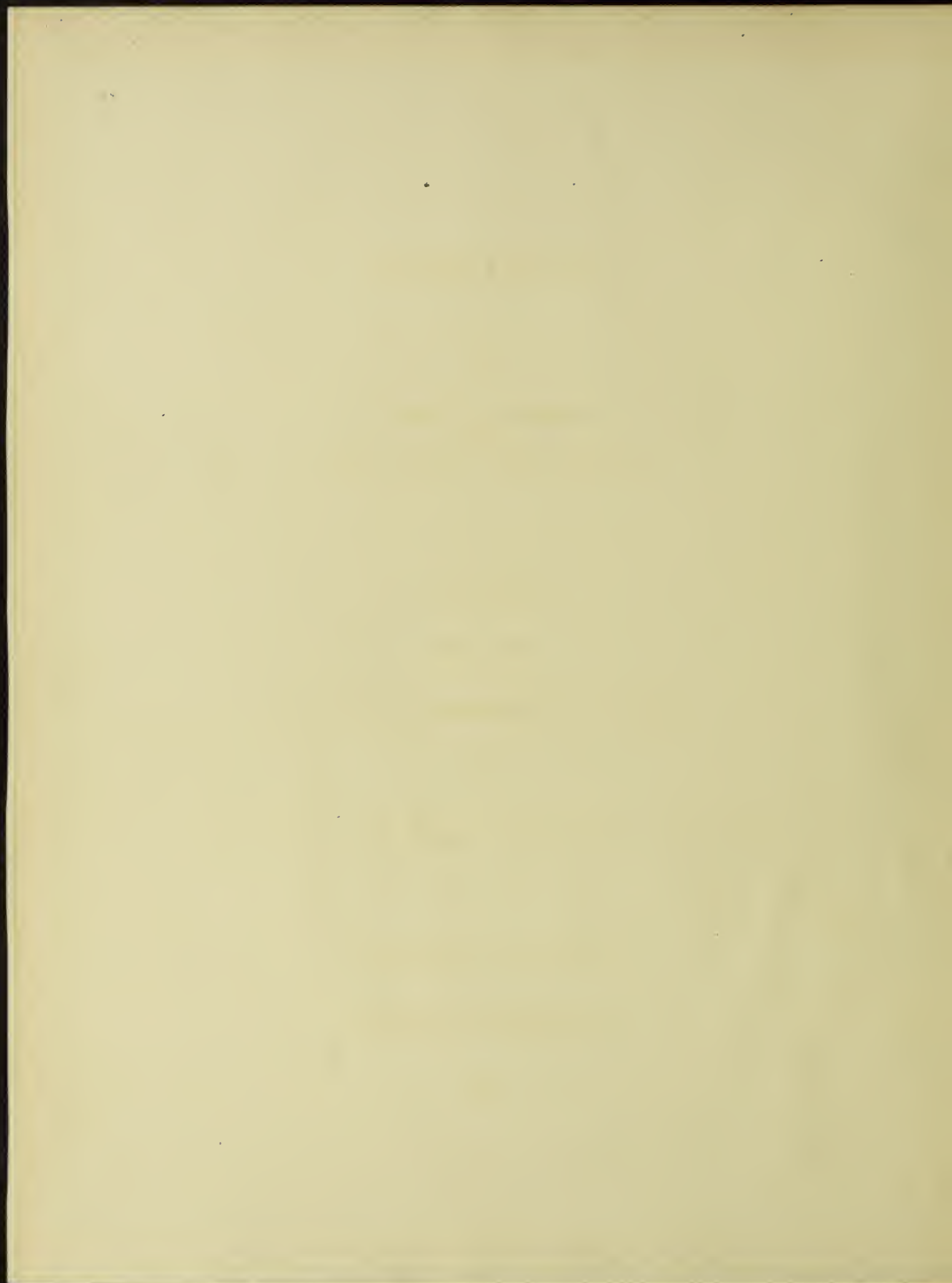
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HOUSE LIGHTING

BY

**HENRY NAFZIGER
AND
HARRIE EARL VAN DE VEER**

T H E S I S

FOR THE

DEGREE OF BACHELOR OF SCIENCE

IN

ELECTRICAL ENGINEERING

COLLEGE OF ENGINEERING

UNIVERSITY OF ILLINOIS

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UNIVERSITY OF ILLINOIS

May 29, 1902

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

HENRY NAFZIGER AND HARRIE EARL VAN DE VEER

ENTITLED HOUSE LIGHTING

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

H. G. Hake

Instructor in Charge

APPROVED:

E. M. Berg

HEAD OF DEPARTMENT OF ELECTRICAL ENGINEERING.

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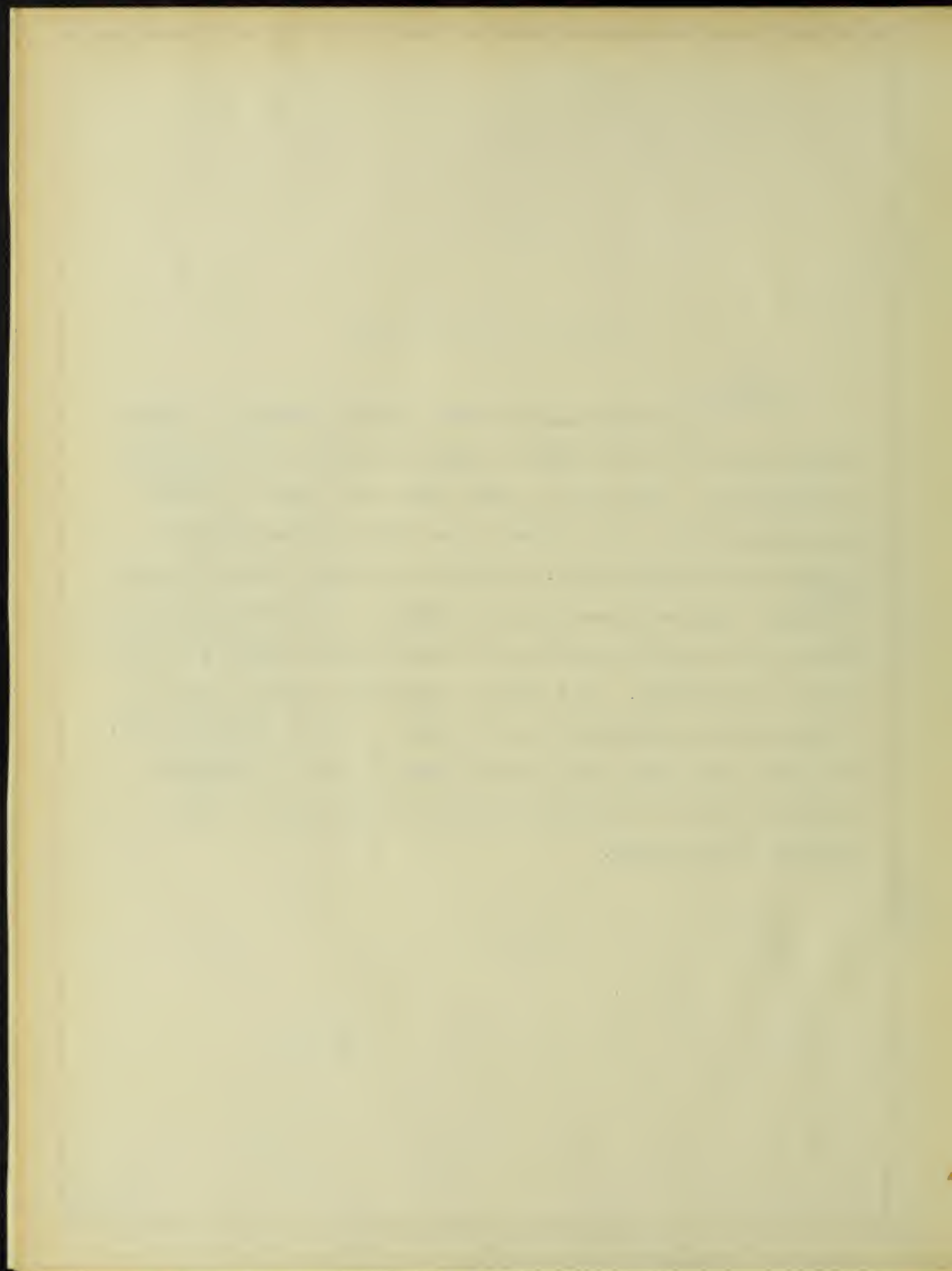


I N T R O D U C T I O N

* * *

It is the object of this work to present a reasonably accurate list of costs of typical electric house lighting installations. The data has been worked out from two representative houses, one of seven rooms and bath, the other of eleven rooms besides bath. The cost of wiring a house smaller than the first of these would not warrant much previous investigation but could be left to be decided by the competitive bids of the contractors. In a house of more than eleven rooms the wiring cost is sufficient to allow for a special investigation. Besides, such large houses vary so much in their arrangement that it would be a difficult matter to select one as being typical of the class.

* * *



M E T H O D

There are three typical installations calculated for each house.

No. 1. In this installation the primary object is to electrically equip a house as cheaply as possible. Essentials for good illumination are observed only as far as they do not materially increase the cost.

No. 2. Here more attention is given to convenience and good illumination.

No. 3. In this case economy is only a secondary consideration, good illumination, convenience and decorative lighting being considered first.

As in some cities it is required that all interior work be of conduit construction, each of these installations is calculated for conduit and for knob and tube wiring separately.

It is often desired to have the house wired and finished ready for the fixtures, which are to hung later and perhaps by another party, so the fixtures are tabulated separately. This allows also for the substitution of other fixtures for those here selected. Switches, however, should be attached before the walls are decorated, as there is always more or less patching to be done around them.

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GENERAL PRINCIPALS
of
HOUSE LIGHTING.

The purposes of house lighting are general illumination, special illumination and decorative lighting.

For general illumination the light should be well diffused, should be of such intensity as not to cause eye strain, and should never shine directly into the eyes. This effect is obtained by the use of frosted bulbs or proper shades and reflectors.

Special illumination requires light of greater intensity over a certain area. This requires additional fixtures or special reflectors.

The placing of decorative lights depends entirely upon the house. They should, however, not interfere with the other principals of illumination.

LIVING ROOM

Probably the most important room for consideration is the living room, as this is the one most commonly used during the evening. It must have general illumination and good light for reading. These two objects may, in general, be most economically obtained by a light in the center of the room, equipped with a globe or reflector, which, while allowing for general illumination, will concentrate a considerable portion of the light with-

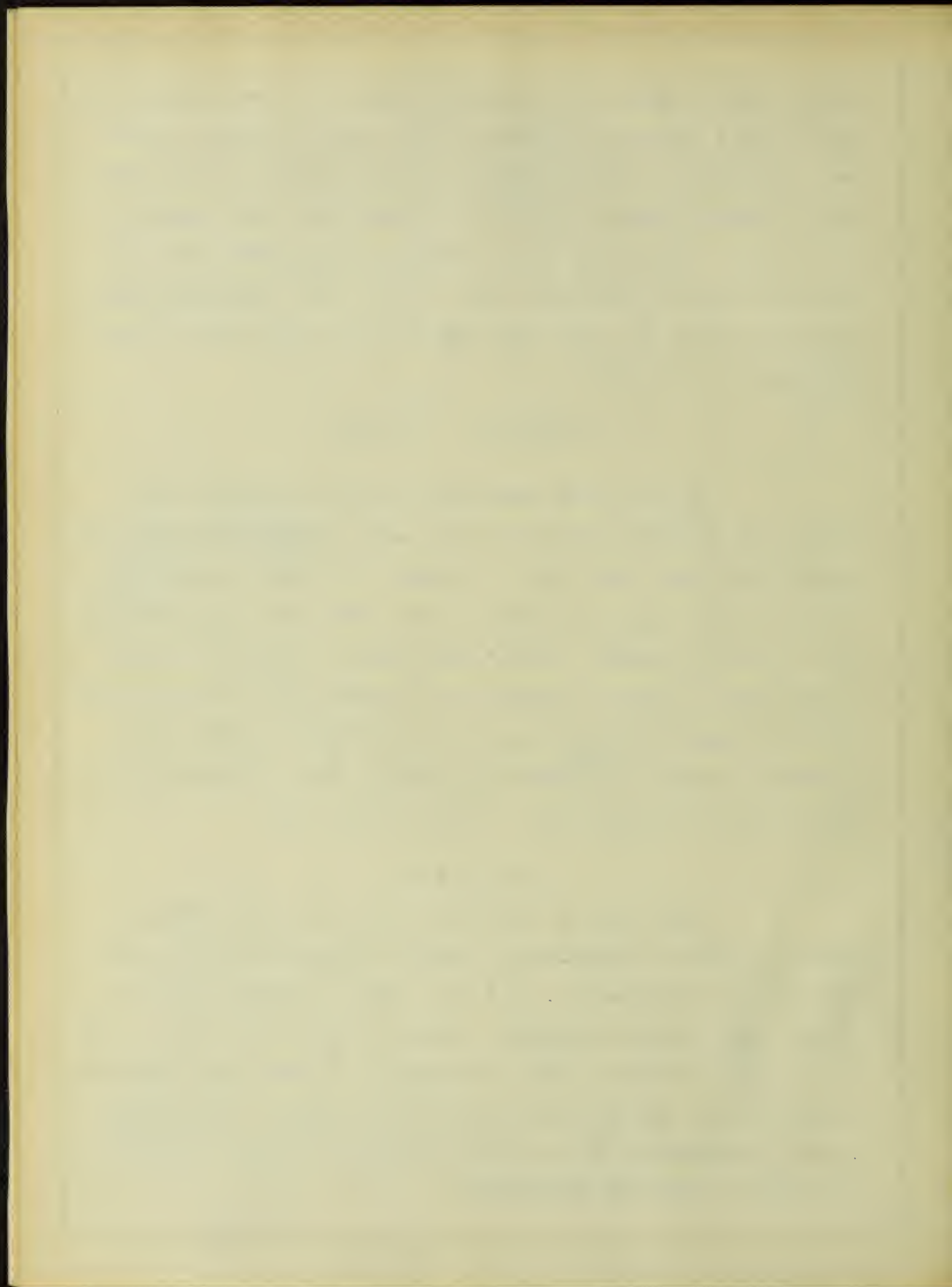
in the area in which it is desired to read. In a more costly installation a light may be placed in the center, paying a little more attention to artistic effect in the selection of the globe, while bracket lamps are provided for localities where reading is to be done. Table lamps to be used for purposes other than for decoration are not considered here, as they are very inefficient, throwing most of the light upon the base and only a small percent out where it is desired.

D I N I N G R O O M

In the dining room strong light is desired on the table, the reflection from the table being usually sufficient for general lighting. This may be obtained by a single pendant fixture (usually a dome), so hung as not to throw the light into the eyes of persons seated. Should more light be wanted for general illumination, it may be obtained by inserting small frosted bulbs into the beams in the ceiling or by suspending therefrom short pendants arranged systematically about the room. These can be made to add to the decorative effects of the room.

K I T C H E N.

Where only one light is allowed for the kitchen, it should be high up (preferably a ceiling fixture), so as to give good general illumination. But with this arrangement one must always work in ones own shadow, making it highly desirable to add two or three bracket lights. One should be placed high over the sink, one over the table and one over the ranges. These should be well insulated so that a ground through the piping connected to range or sink were impossible.



P A N T R Y

A light in the center of the pantry about six and one-half feet from the floor will give the general illumination desired in cupboards and on shelves.

H A L L

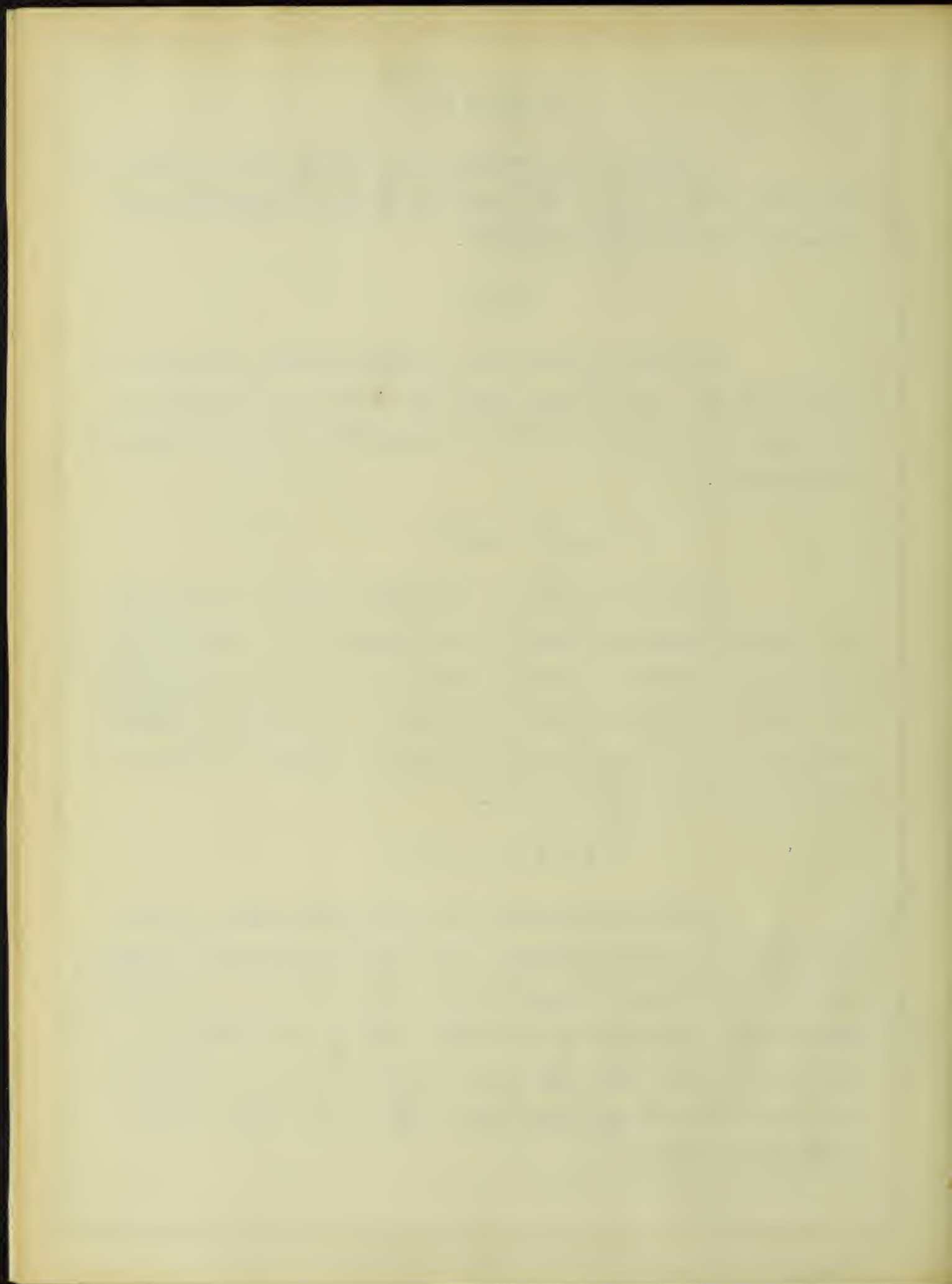
The hall should have a diffused light, which need not be very strong. The fixture should be close to the ceiling and the light so directed by means of reflectors as to give a general distribution.

B E D - R O O M

In the bedroom it is desirable to have, in addition to a general lighting fixture in the center of the room, sufficient light around the dresser. This may be best accomplished by one light on either side and one above it. If greater economy is desired, one on either side and higher up, or even a single light to the left and up, may be used.

B A T H - R O O M

Where the bathroom is not to be used much or where economy is an important factor, one light in the center, hanging about six and one-half feet from the floor, will do, as the walls are usually light and the room small. Where the mirror is to be used for shaving, there should be a light at least on one side of it. For greater convenience, there should be a light on both sides of the mirror.



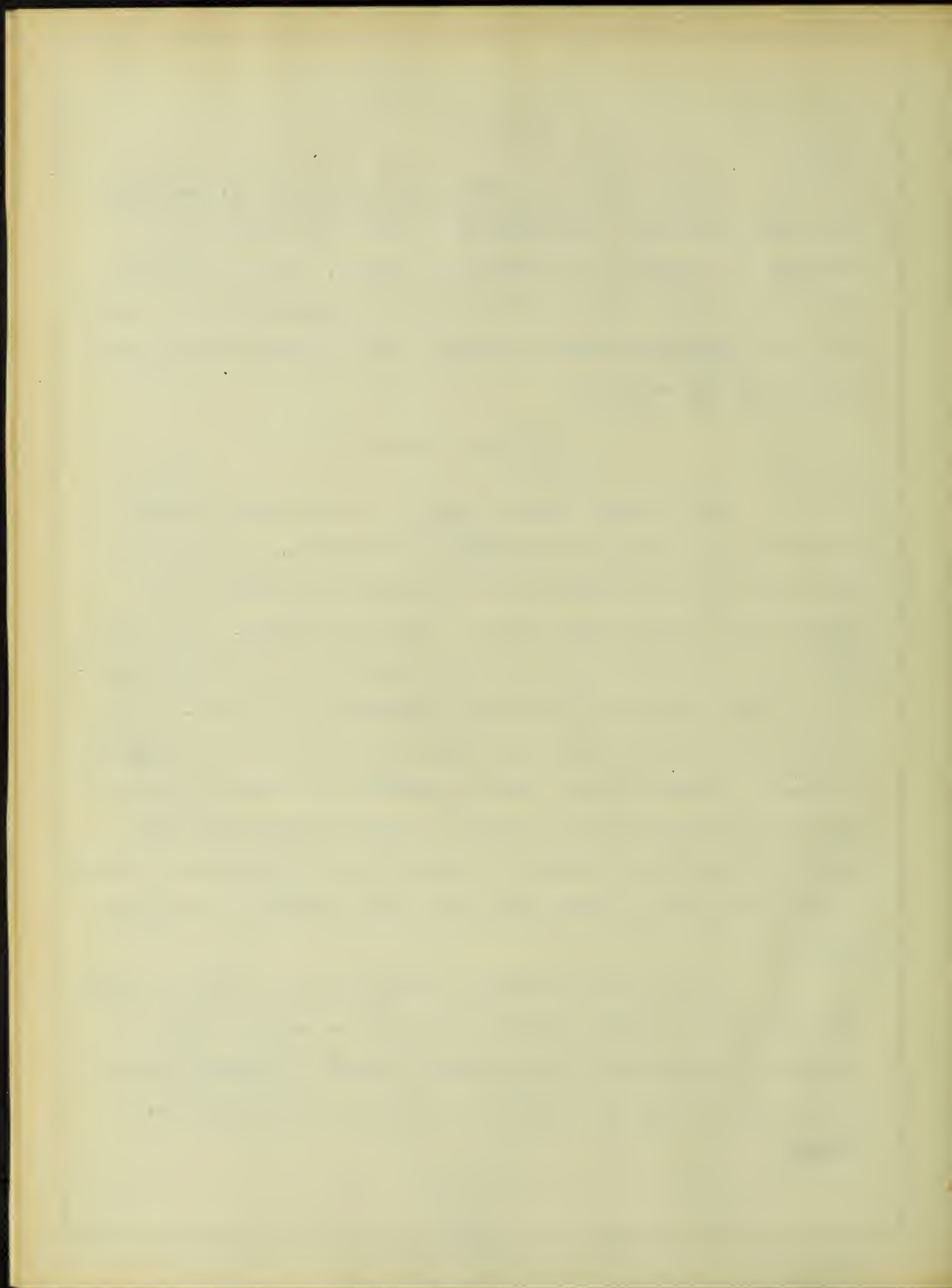
P O R C H

Porch lights are primarily intended for illuminating the floor and steps. Sometimes one or more are added for convenience in reading or for decorative effect. The one lighting the steps should, however, be controlled independent of the others. The best results are usually obtained with a semispherical globe fastened to the ceiling.

B A S E M E N T

The basement lights should be on one main circuit controlled by a switch at the head of the stairs. In this way, when this switch is turned off, one is sure that there are no lights still burning after one has left the basement. One light in the center of each room is usually sufficient for cellar lighting, except that one light should illuminate the stairs. It is bad practice to have each snap socket turned on and off independently, as a basement floor, even if cemented, is a good conductor, making it liable for one to sustain a severe shock unless the socket is perfectly insulated. The additional cost of snap switches and connecting circuits cause such installations to be tolerated.

In the less economical installation the lamps, instead of simple snail sockets, might be inexpensive ceiling lights controlled by snap switches at convenient places. The whole circuit should still be manipulated from one switch at the head of the stairs.

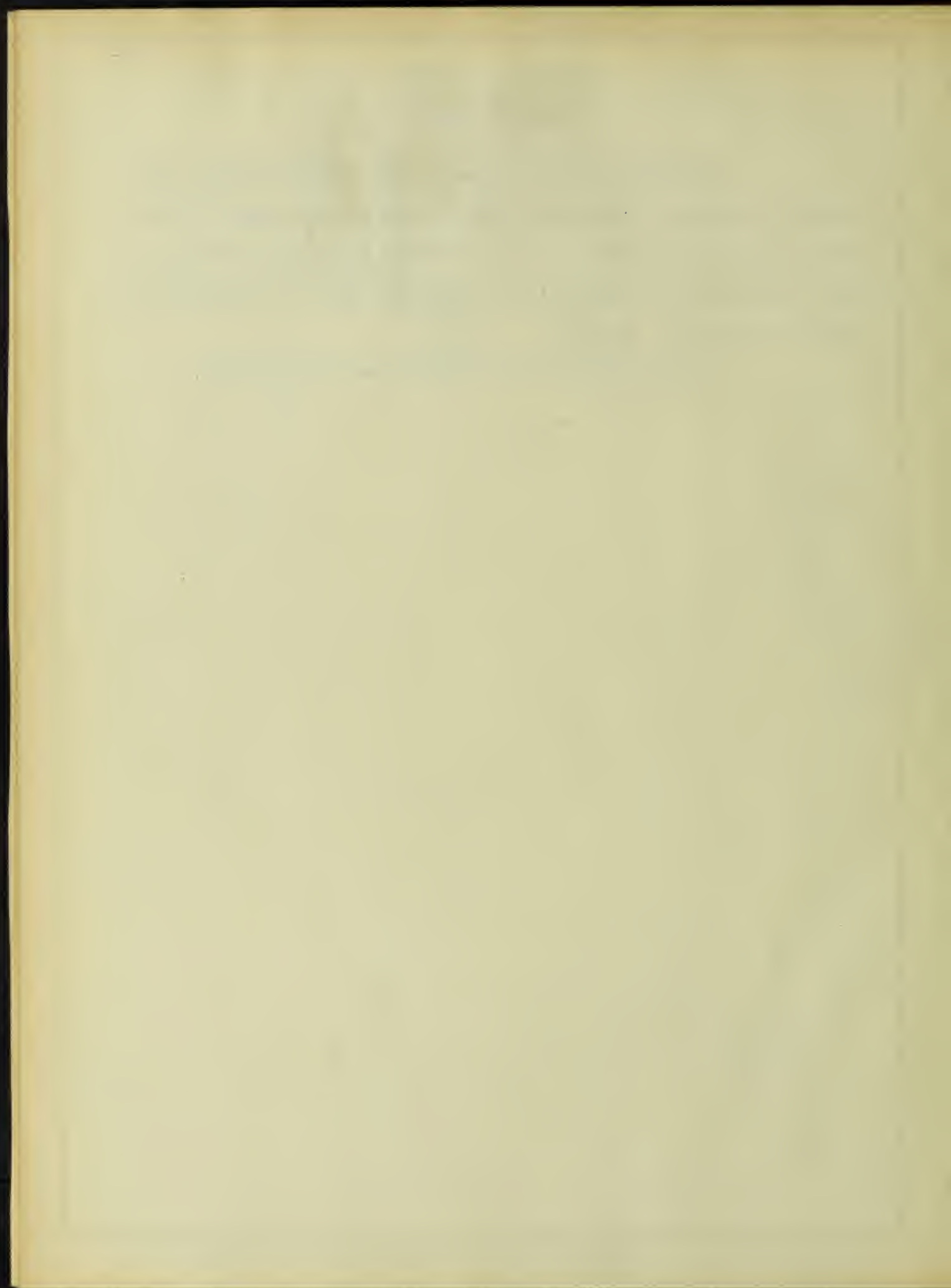


G E N E R A L

Switches should not be located behind doors, for obvious reasons. They should be located within sight of the lamps which they control, as this avoids confusion and makes it less likely that lamps will be forgotten and left burning when persons leave the room.

Underwriters' rules are followed throughout.

* * *



D A T A
M E T H O D O F O B T A I N I N G

Data for the necessary materials was obtained by drawing in the circuits on the plans and calculating the various amounts.

An effort was made to make the prices as near to those actually obtained by the trade as possible.

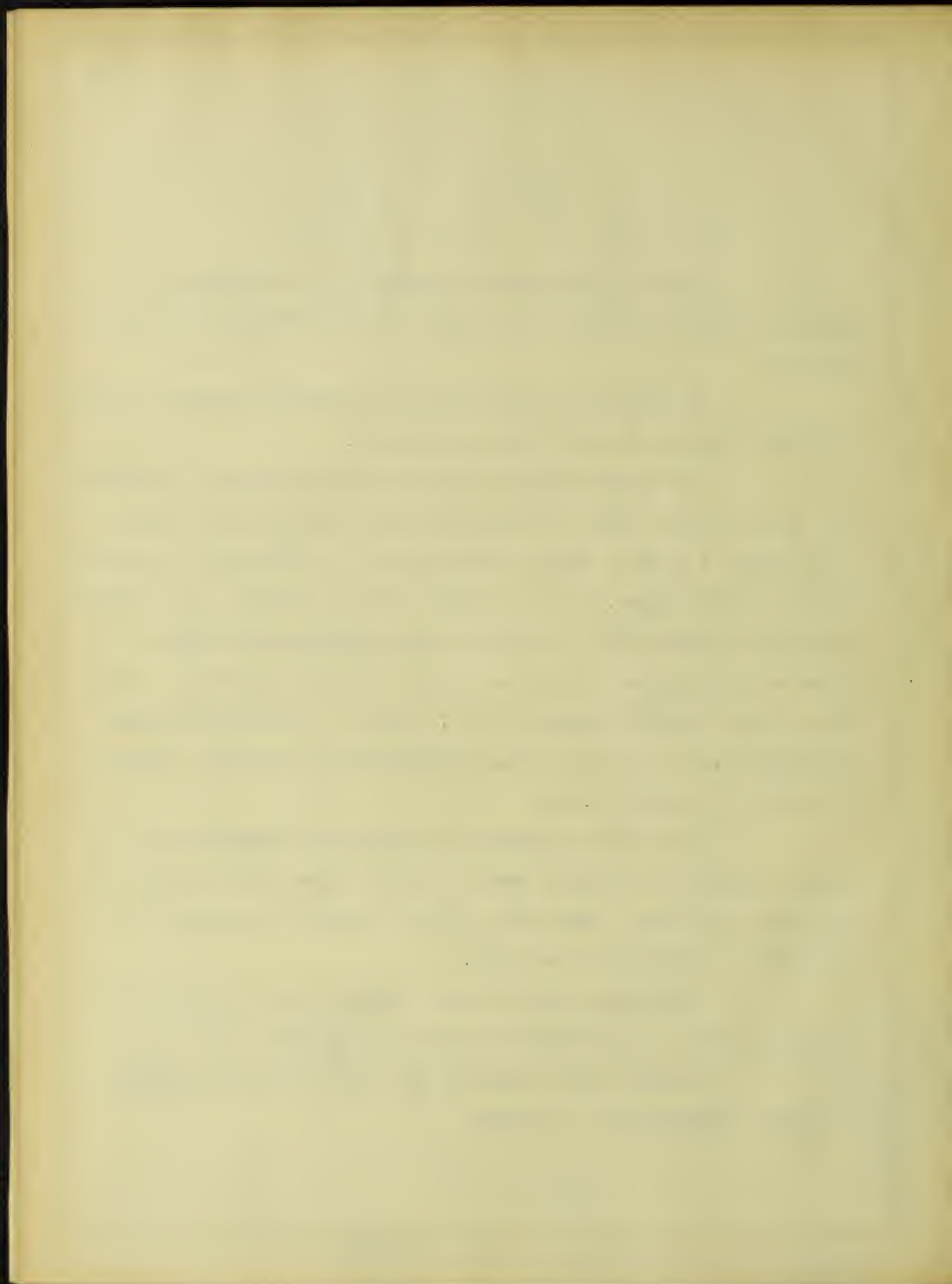
Data concerning the amount of time required per outlet for knob and tube work was obtained from electrical contractors. It covered 17 houses, having 458 outlets, for which were required 594- $\frac{1}{2}$ hours of labor. Here a switch, ceiling light or side light or plug receptacle were counted as one opening each, while a three-way switch was counted as one and one-half openings. Thus the average time per opening was 1.3 hours. Electricians' wages vary from \$.55 to \$.75 per hour in Champaign and Urbana, making the cost per opening \$.845.

The various contractors interviewed estimated the labor required for conduit work at almost twice that required for knob and tube work. Hence the cost per opening in conduit construction is assumed to be \$1.65.

Prices for material were obtained from the wholesale discount sheet of the Central Electric Supply Co.

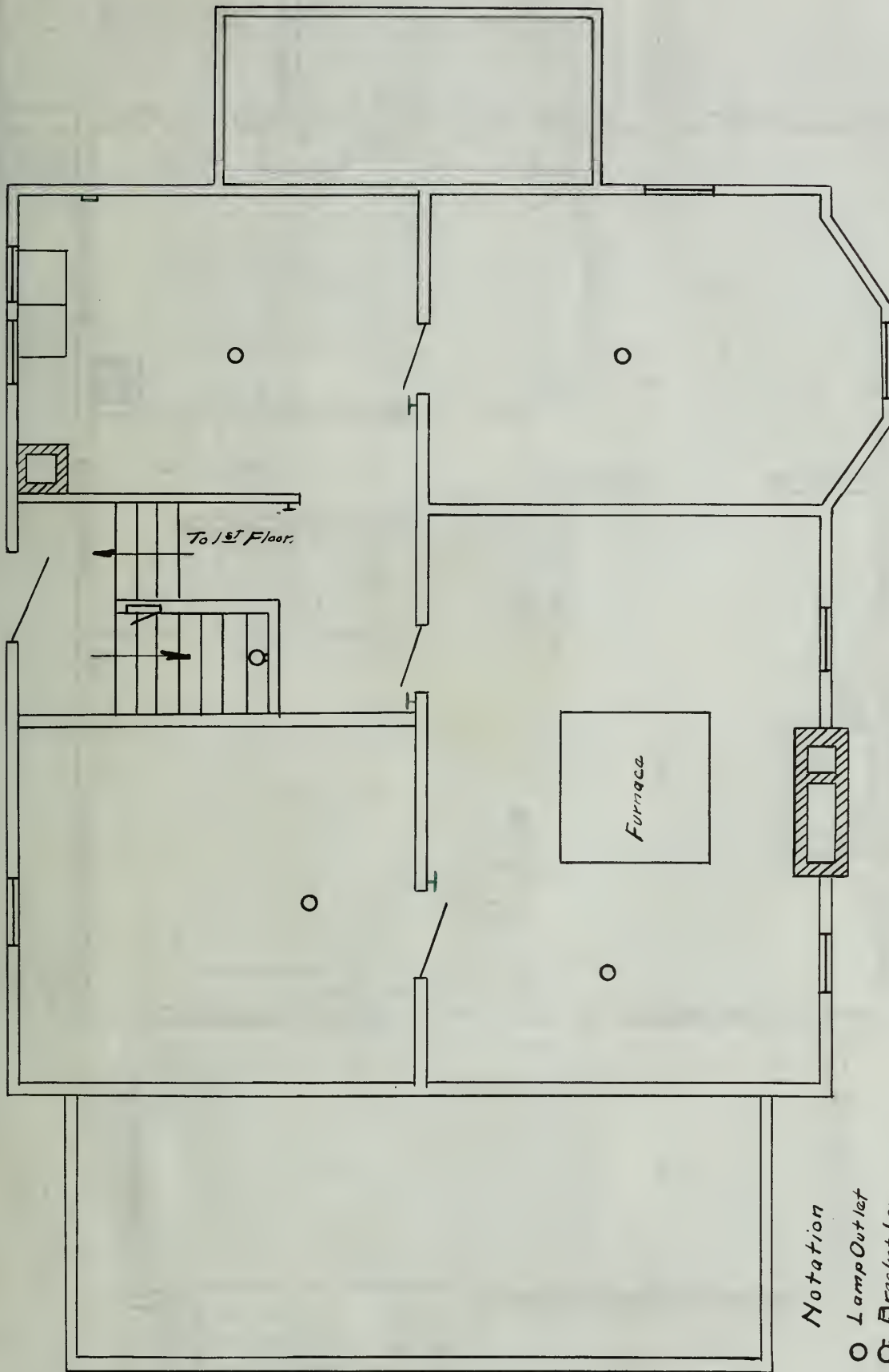
Fixtures were selected from the electrical catalog of Sears, Roebuck & Co., Chicago.

* * *



D A T A & P L A N S
F O R A
S E V E N R O O M H O U S E

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ROYAL ANTHROPOLOGICAL INSTITUTE
OF GREAT BRITAIN AND IRELAND
VOLUME 10
PART 1
1880

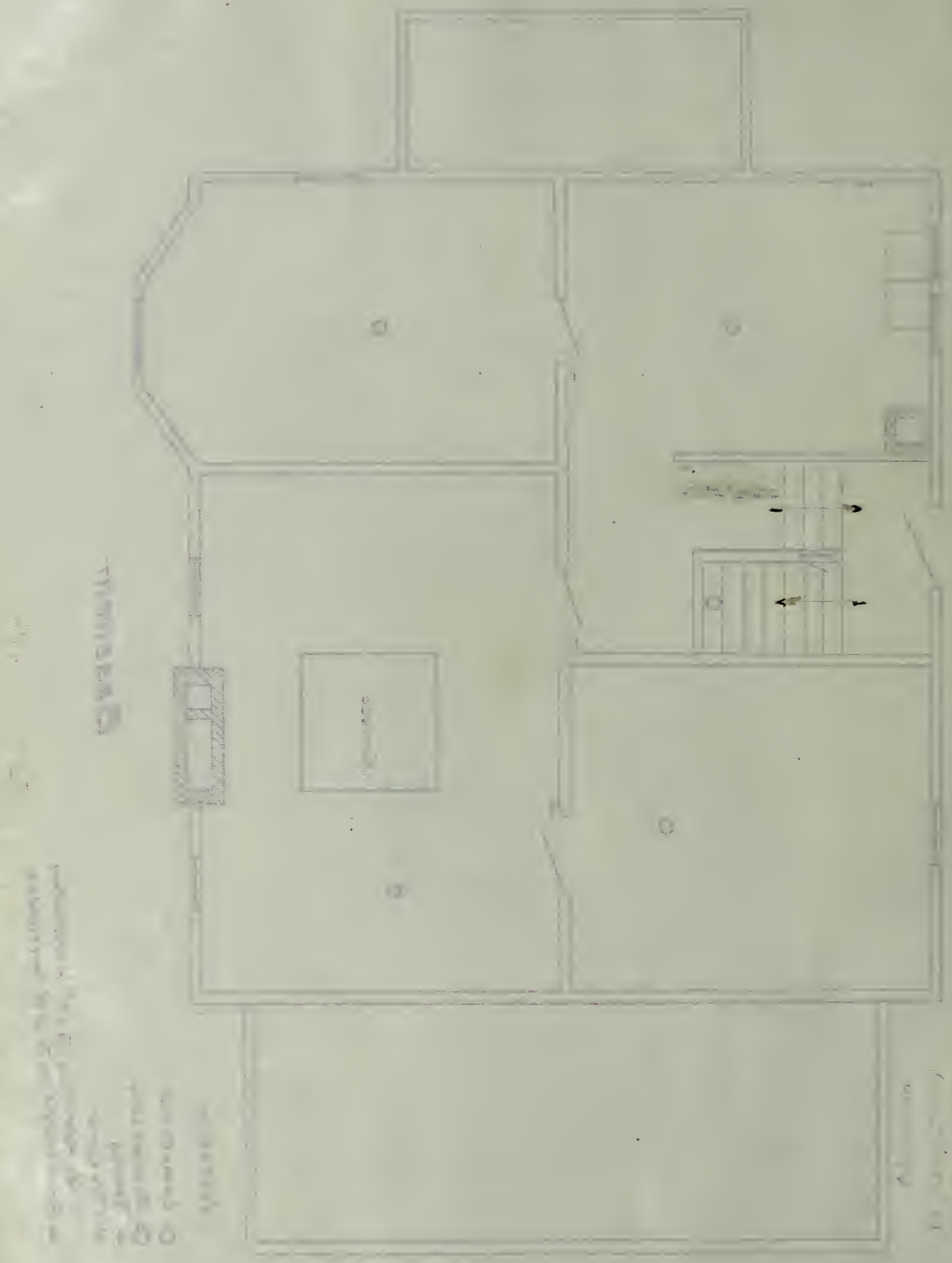


BASEMENT

Notation

- O Lamp Outlet
- ⊕ Brocket Lamp Switch
- U Plug Outlet

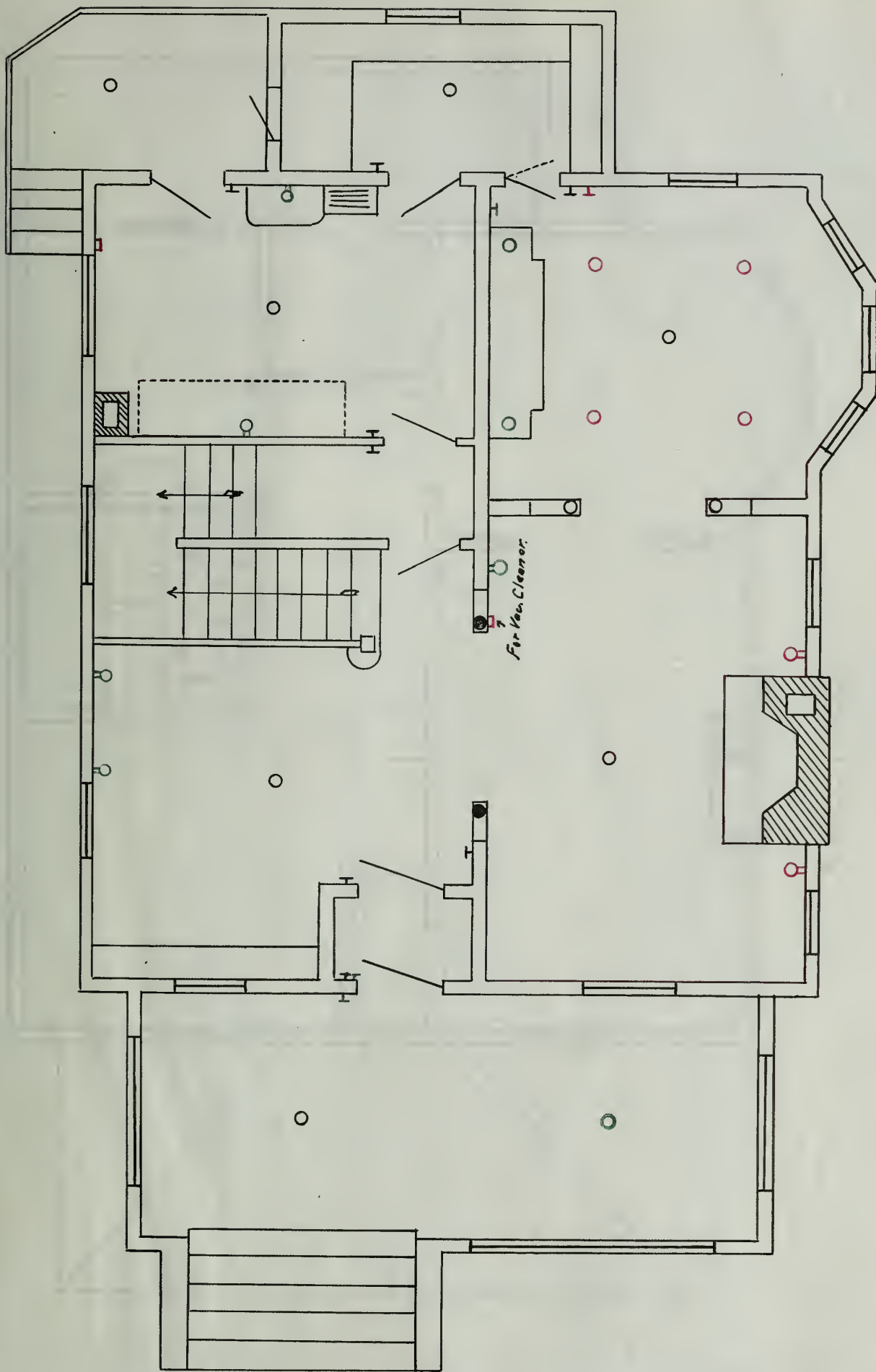
Red = Additions To 1st Installation
 Green = Additions To 2nd Installation.



PLAN OF THE BUILDING

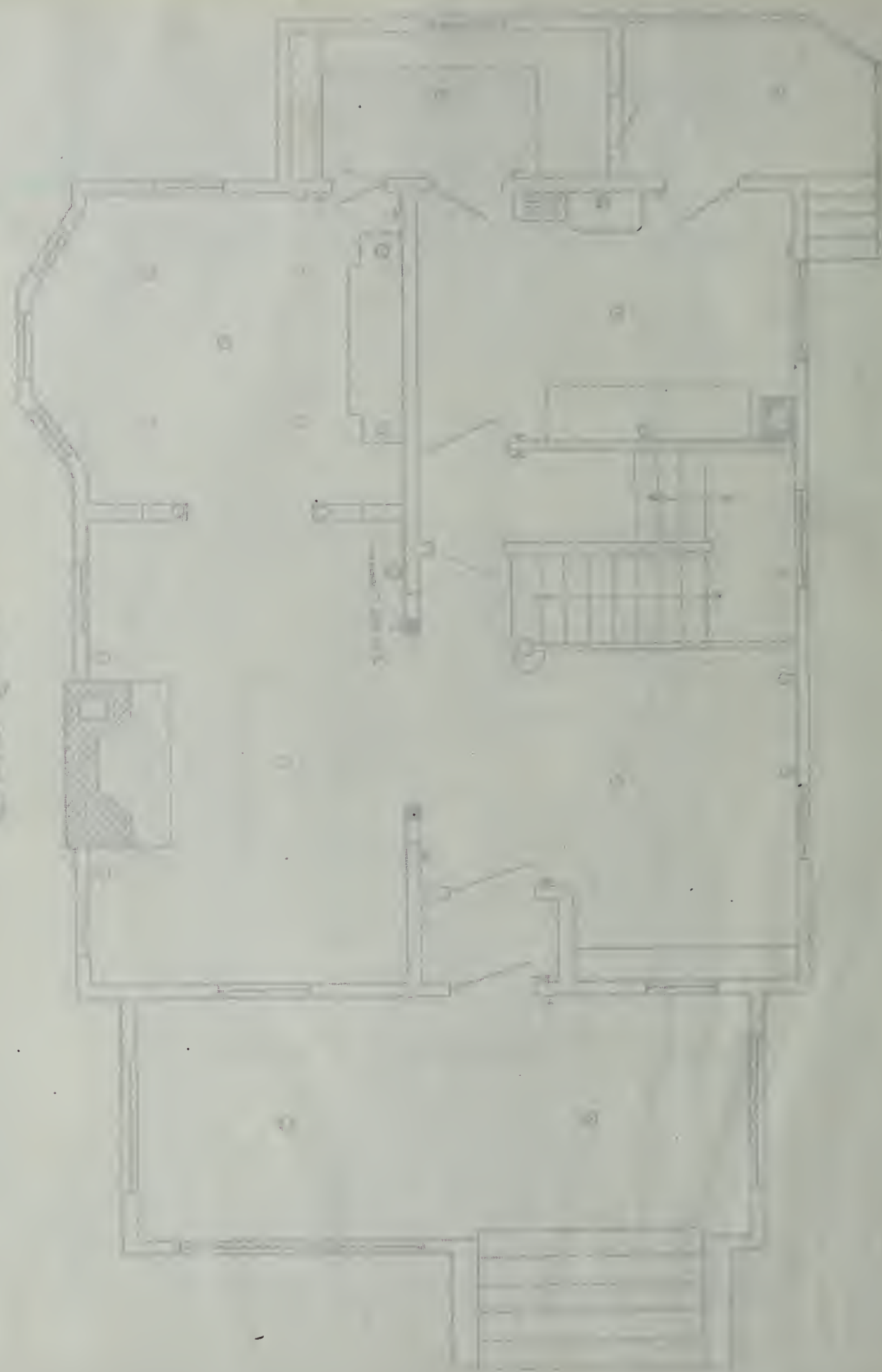
1. Entrance
 2. Hall
 3. Kitchen
 4. Dining Room
 5. Parlor
 6. Study
 7. Bed Room
 8. Bath
 9. Staircase
 10. Porch

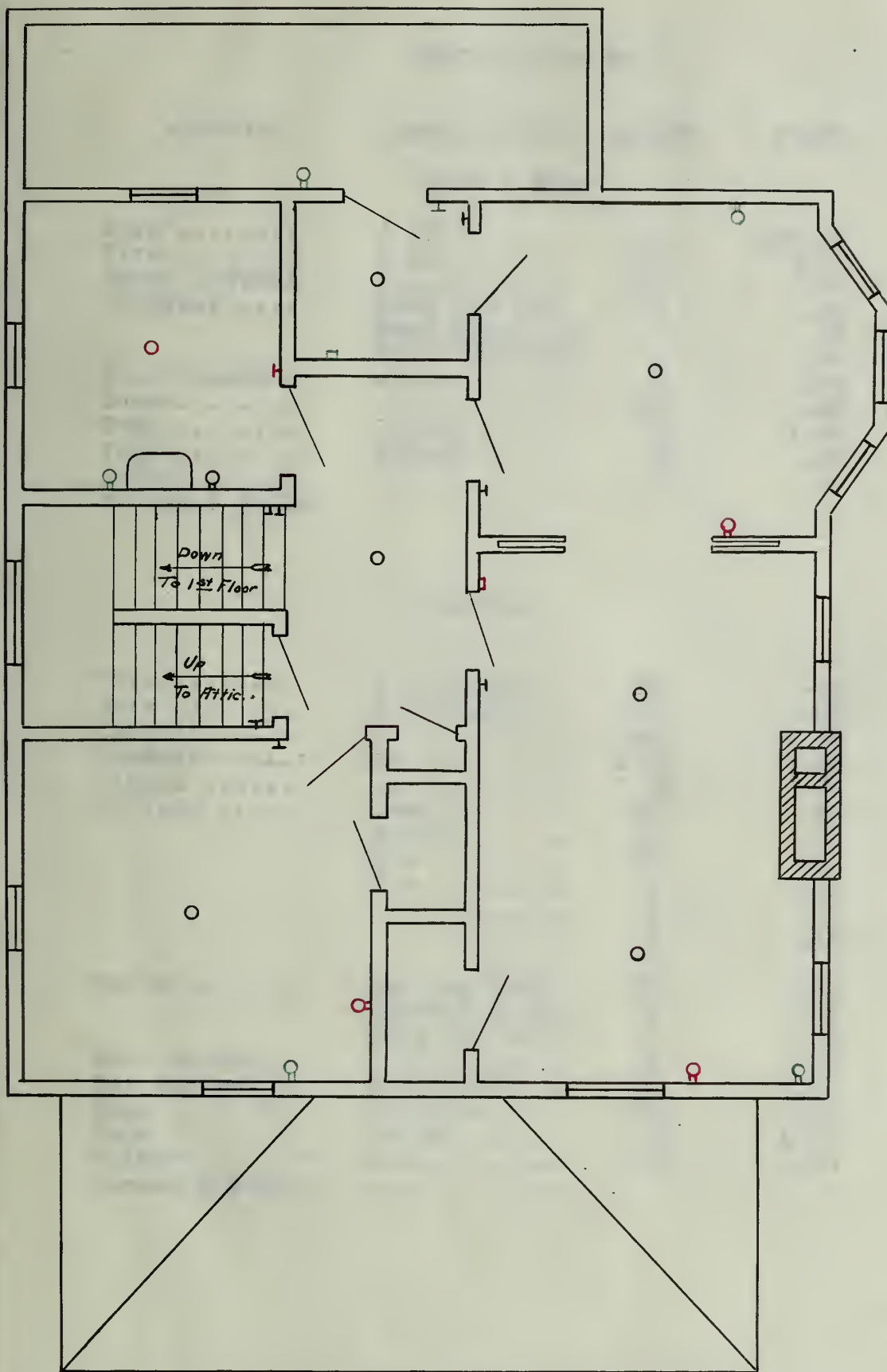
1. Entrance
 2. Hall
 3. Kitchen
 4. Dining Room
 5. Parlor
 6. Study
 7. Bed Room
 8. Bath
 9. Staircase
 10. Porch



FIRST FLOOR.

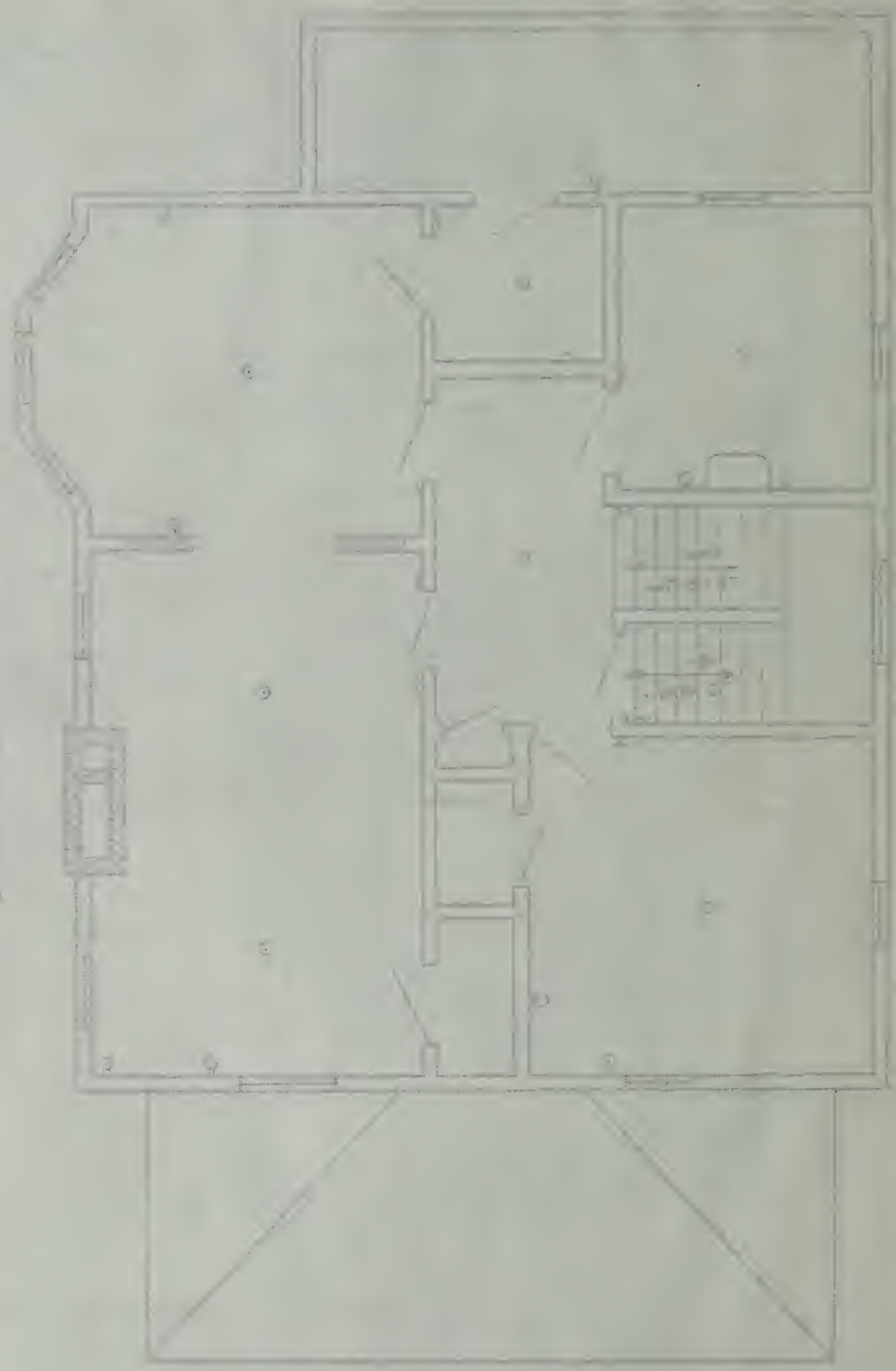
W. 10th Street





SECOND FLOOR.

PLAN OF BUILDING



INSTALLATION NO. I.

MATERIAL	DESCRIPTION	AMOUNT	PRICE	EXTENSION
Knob & Tube				
Wire	# 10	50'	\$15.55	\$.78
Wire	# 14	800'	9.00	7.20
Knobs & Tubes	.....	425	1.00	4.25
Switches	Snap Two Way	13	.20	2.60
	Snap Three Way	2	.35	.70
	Main Two Pole	1	.60	.60
Fuse Blocks .	.....	3	.25	.75
Loom .....	.....	35'	.05	1.75
Tape	Rubber	$\frac{1}{4}$ #	1.00	.25
Tape	Friction	$\frac{1}{2}$ #	.30	.15
Solder .....	.....	1#	.10	.10
Screws & Nails	.....			.75

				\$19.88

Conduit

Wire	# 10 Double .	25'	.02	\$.50
Wire	# 14 Double .	400'	.01	4.00
Conduit	1"	24'	10.08	2.40
Conduit	$\frac{1}{2}$ "	340'	6.08	20.67
Clamps .....	.....	5#	.20	1.00
Outlets	Lamp	20	.18	3.60
	Switch	15	.18	2.70
	L's	20	.12	
	T's	6	.12	
	.....	3	.12	
	.....	2	.12	
	.....	1	.12	3.84
Switches	Two Way Snap	13	.20	2.60
	Three Way Snap	2	.35	.70
	Main Two Pole	1	.60	.60
Fuse Blocks..	.....	3	.25	.75
Cut Out Box .	3 Circuits ..	1	1.60	1.60
Tape	Friction	$\frac{1}{2}$ #	.30	.15
Tape	Rubber	$\frac{1}{4}$ #	1.00	.25
Solder .....	.....	1#	.10	.10
Screws & Nails	.....			.50

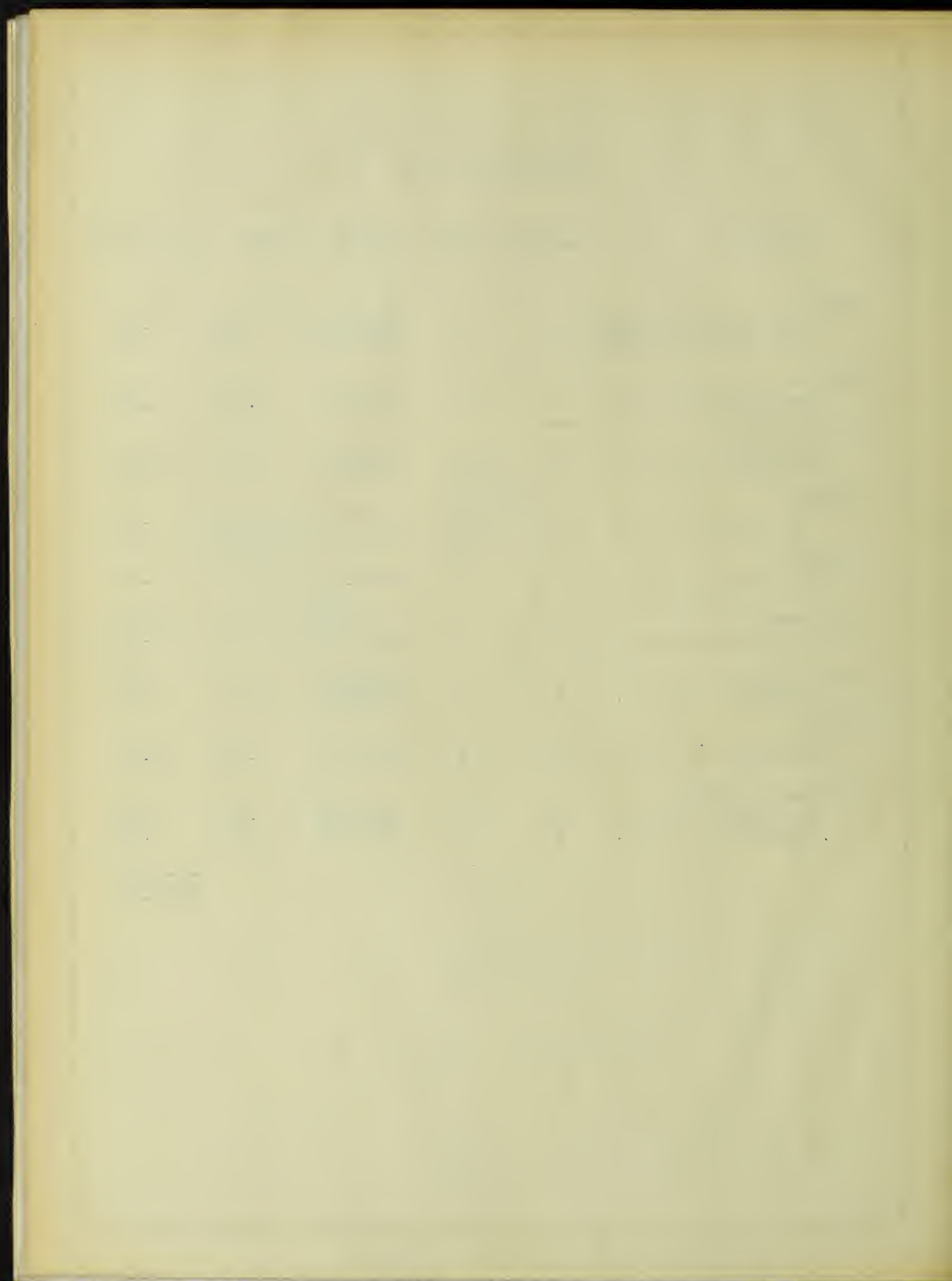
				\$45.96

INSTALLATION NO. I.

FIXTURES	AMOUNT	LIGHTS	CAT.NO.	PRICE	EXTENSION
Hall					
1'st floor ceiling	1	1	34E7008	\$.75	\$.75
2'nd floor ceiling	1	1	34E7008	.75	.75
Parlor					
Ceiling	1	3	34E5311	2.85	2.85
Dining Room					
Ceiling	1	1	34E5202	1.20	1.20
Pantry					
Ceiling	1	1	34E5200	.85	.85
Kitchen					
Ceiling	1	1	34E7554	1.40	1.40
Bed Room					
Ceiling	5	5	34E7554	1.40	7.00
Bath Room					
Bracket	1	1	34E7546	1.40	1.40
Porch					
Ceiling	2	2	34E7008	.75	1.50
Basement & Attic					
Ceiling	5	5	34E6500	.23	1.15
Bracket	1	1	34E6506	.30	.30

				\$ 19.15	

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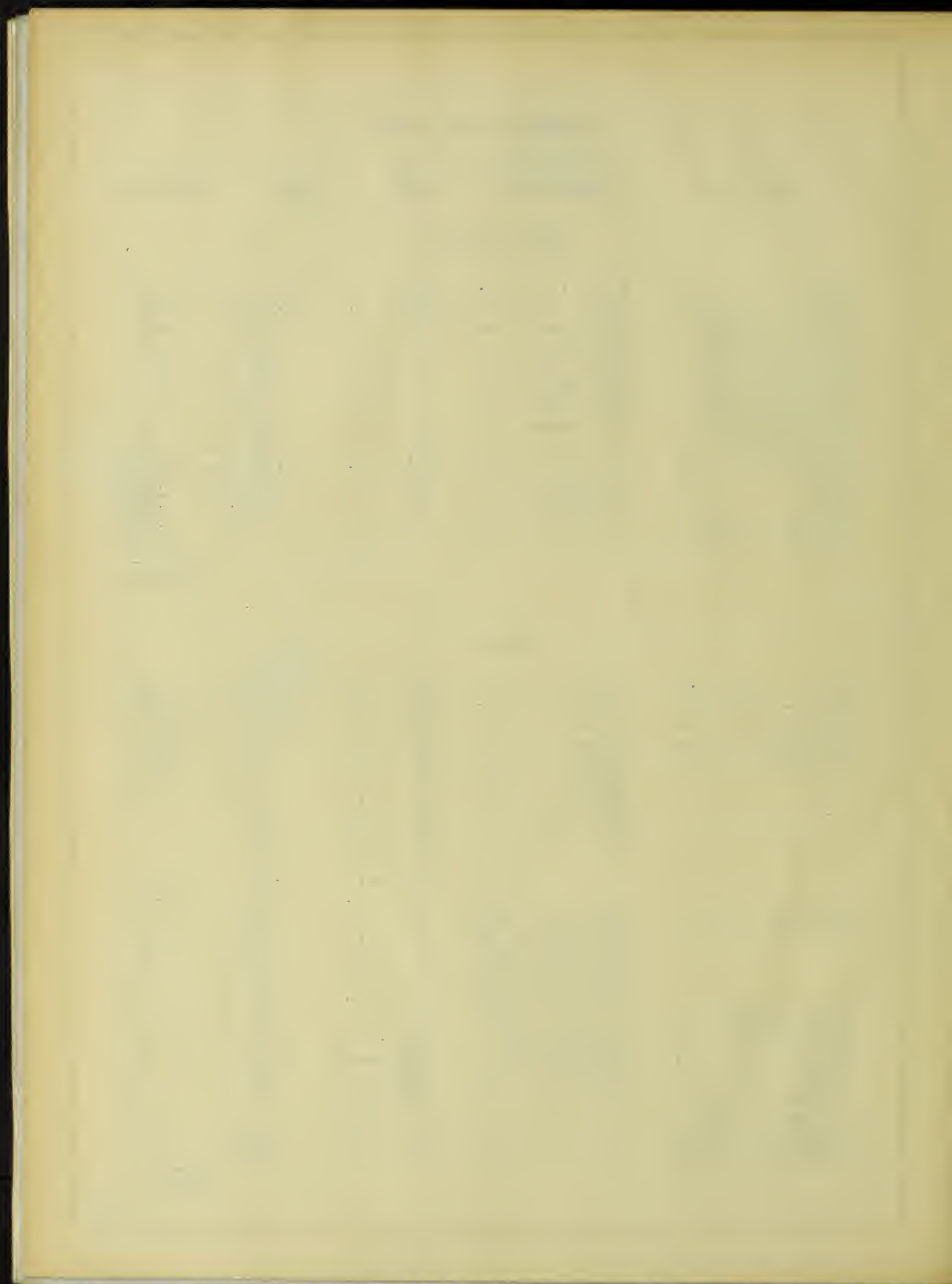
INSTALLATION NO.2.

MATERIAL	DESCRIPTION	AMOUNT	PRICE	EXTENSION
Knob and Tube				
Wire	# 10	50'	\$15.55	\$.78
Wire	# 14	942'	9.00	8.48
Knobs & Tubes .	.....	525	1.00	5.25
Switches Snap .	Two Way	8	.20	1.60
Switches Snap .	Three Way ...	1	.35	.35
Switches Push .	Two Way	7	.50	3.50
Switches Push .	Three Way ...	1	.63	.63
Switches Main .	Two Pole	1	.60	.60
Fuse Blocks ...	.....	3	.25	.75
Loom .....	.....	50'	.05	2.50
Tape	Rubber	$\frac{1}{4}$ #	1.00	.25
Tape	Friction	$\frac{1}{2}$ #	.30	.15
Solder .....	.....	1#	.10	.10
Screws & Nails	.....	.....	...	.85

				\$25.79

Conduit				
Wire	# 10	25'	\$.02	\$.50
Wire	# 14	471'	.01	4.71
Conduit	1"	24'	10.08	2.40
Conduit	$\frac{1}{2}$ "	450'	6.08	27.36
Outlets	Lamp	30	.18	5.40
	Switch	17	.18	3.06
	Plug	2	.18	.36
	L's	28	.12	
	T's	10	.12	
	.....	3	.12	
	.....	2	.12	
	.....	2	.12	5.40
Switches	Snap Two Way	8	.20	1.60
	Snap Three Way	1	.25	.25
	Push Two Way	7	.50	3.50
	Push Three Way	1	.63	.63
	Main Two Pole	1	.60	.60
Fuse Blocks ...	.....	3	.25	.75
Cut Out Box ...	3 Circuits ..	1	1.60	1.60
Tape	Rubber	$\frac{1}{4}$ #	1.00	.25
Tape	Friction	$\frac{1}{2}$ #	.30	.15
Solder .....	.....	1#	.10	.10
Screws & Brads	.....	.....	...	.60
Clamps .....	.....	6#	.20	1.20
Plug Recepticals	.....	2	.50	1.00

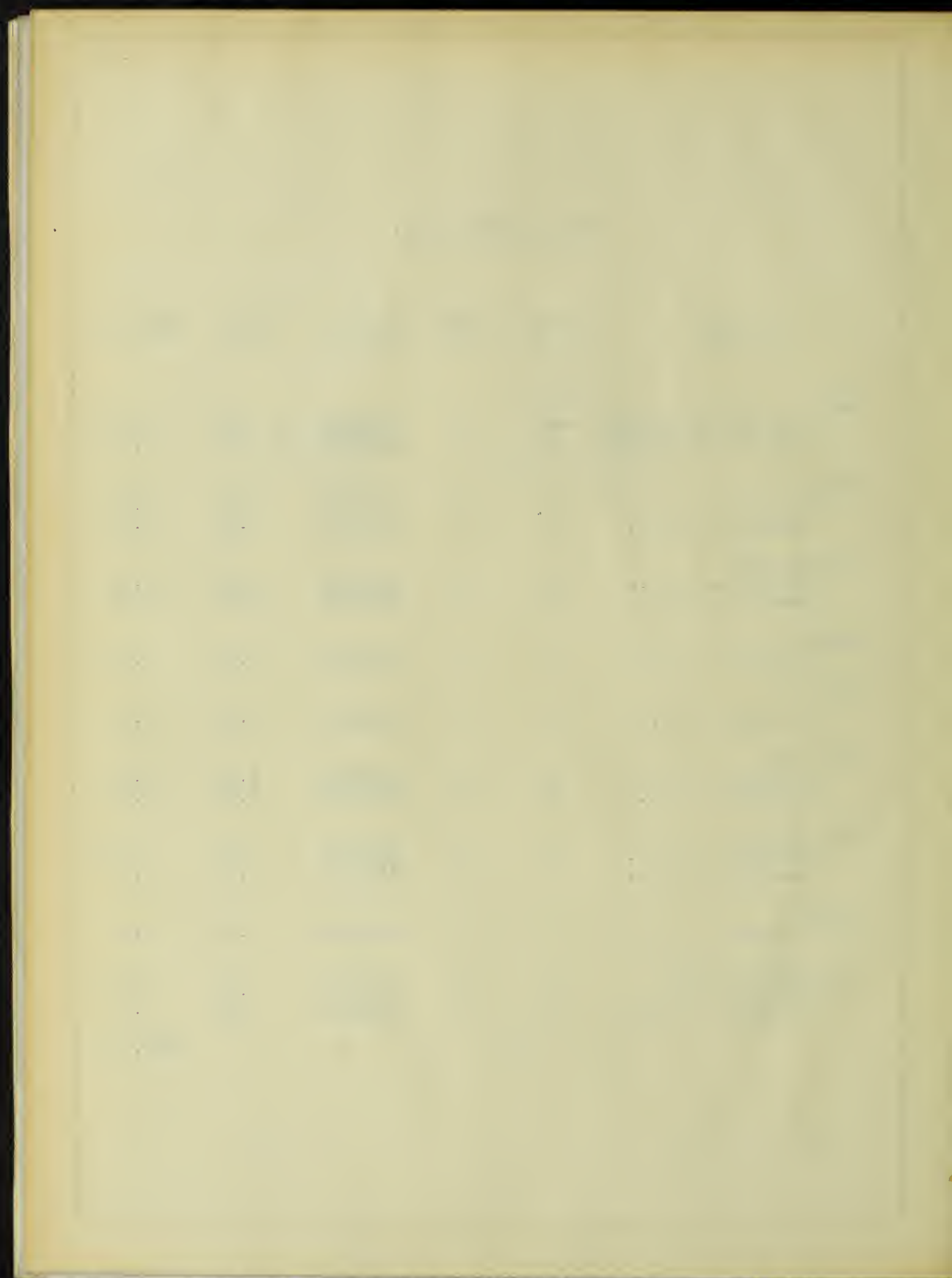
				\$61.42



INSTALLATION NO.2.

FIXTURES	AMOUNT	LIGHTS	CAT.NO.	PRICE	EXTENSION
Hall					
1'st floor ceiling	1	1	34E7008	\$.75	\$.75
2'nd floor ceiling	1	1	34E7008	.75	.75
Parlor					
Ceiling	1	2	34E5328	5.60	5.60
Bracket	2	2	34E5050	1.00	2.00
Dining Room					
Ceiling	4	4	34E6508	.28	1.12
Dome	1	1	34E8530	18.75	18.75
Pantry					
Ceiling	1	1	34E5204	1.20	1.20
Kitchen					
Ceiling	1	1	34E5242	1.40	1.40
Bed Room					
Ceiling	5	5	34E7558	1.60	8.00
Bracket	3	3	34E5050	1.00	3.00
Bath Room					
Ceiling	1	1	34E7008	.75	.75
Bracket	1	1	34E5050	1.00.	1.00
Porch					
Ceiling	2	2	34E7008	.75	1.50
Basement & Attic					
Ceiling	5	5	34E6500	.23	1.15
Bracket	1	1	34E6506	.30	.30

					\$47.27



INSTALLATION NO.3.

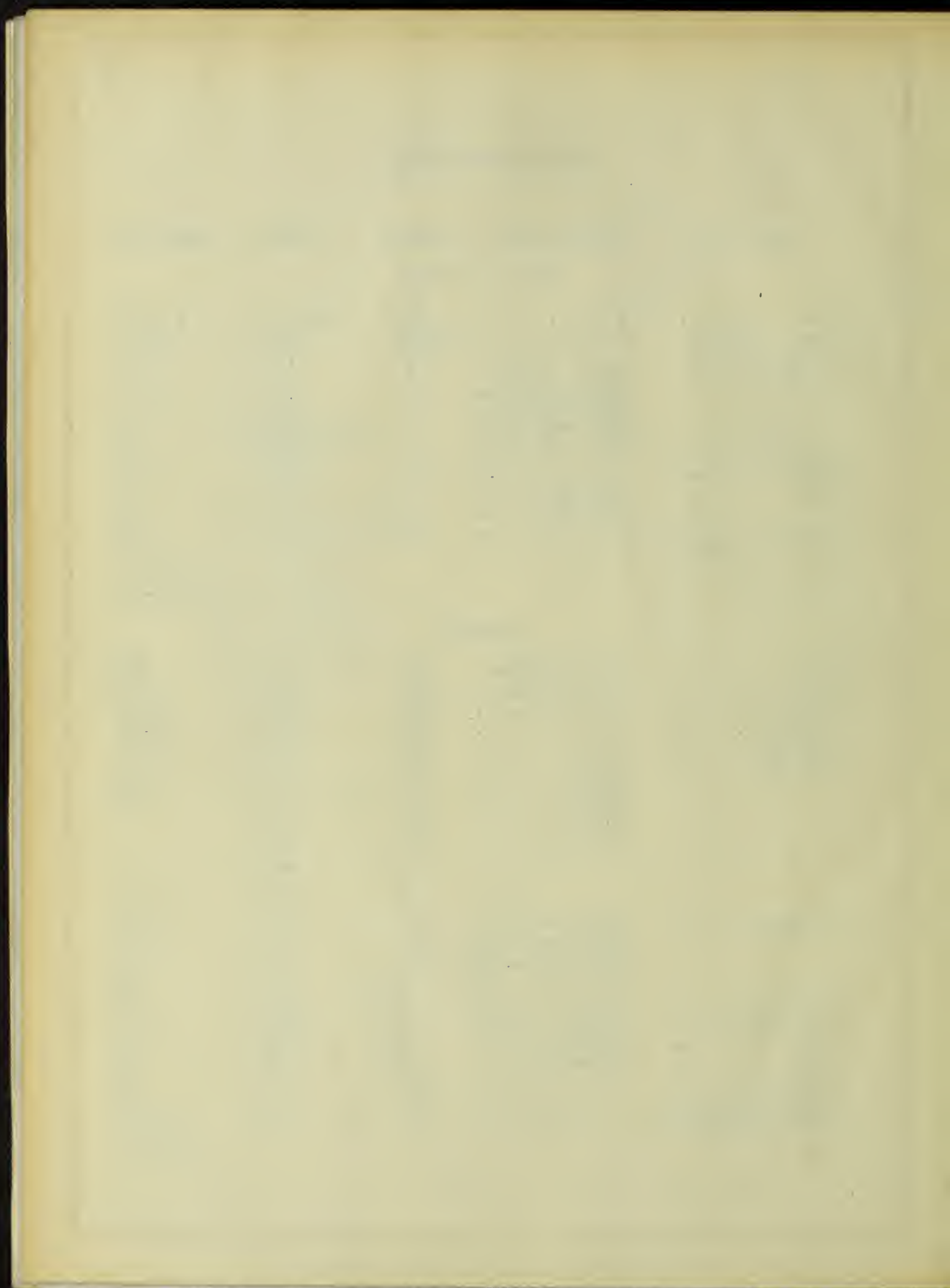
MATERIAL	DESCRIPTION	AMOUNT	PRICE	EXTENSION
Knob and Tube				
Wire	# 10	50'	\$15.55	\$.78
Wire	# 14	1400'	9.00	12.60
Knobs & Tubes	.....	825	1.00	8.25
Switches	Snap Two Way	5	.20	1.00
	Push Three Way	2	.63	1.26
	Push Two Way	18	.50	9.00
	Main Two Pole	1	.60	.60
Fuse Blocks ..	.....	3	.25	.75
Loom .....	.....	75'	.05	3.75
Tape	Rubber	$\frac{1}{2}$ #	1.00	.50
	Friction	1#	.30	.30
Solder .....	.....	1 $\frac{1}{2}$ #	.10	.15
Screws & Nails	.....			1.00

				\$39.94

Conduit

Wire	# 10 Double..	25'	.02	.50
Wire	# 14 Double..	700'	.01	7.00
Conduit	1"	24'	10.08	2.40
Conduit	$\frac{1}{2}$ "	670'	6.08	45.56
Clamps .....	.....	8#	.20	1.60
Outlets	Lamp	43	.18	7.74
	Switch	25	.18	4.50
	Plug	5	.18	.90
	L's	48	.12	
	T's	23	.12	
	.....	3	.12	
	.....	3	.12	
	.....	3	.12	9.60
Switches	Snap Two Way	5	.20	1.00
	Push Two Way	18	.50	9.00
	Push Three Way	2	.63	1.26
	Main Two Pole	1	.60	.60
Fuse Blocks ..	.....	3	.25	.75
Cut Out Box ..	Three Circuit	1	1.60	1.60
Tape	Rubber	$\frac{1}{2}$ #	1.00	.50
Tape	Friction	1#	.30	.30
Solder .....	.....	1 $\frac{1}{2}$ #	.10	.15
Screws & Brads	.....			.75
Plug Recepticals	.....	5	.50	2.50

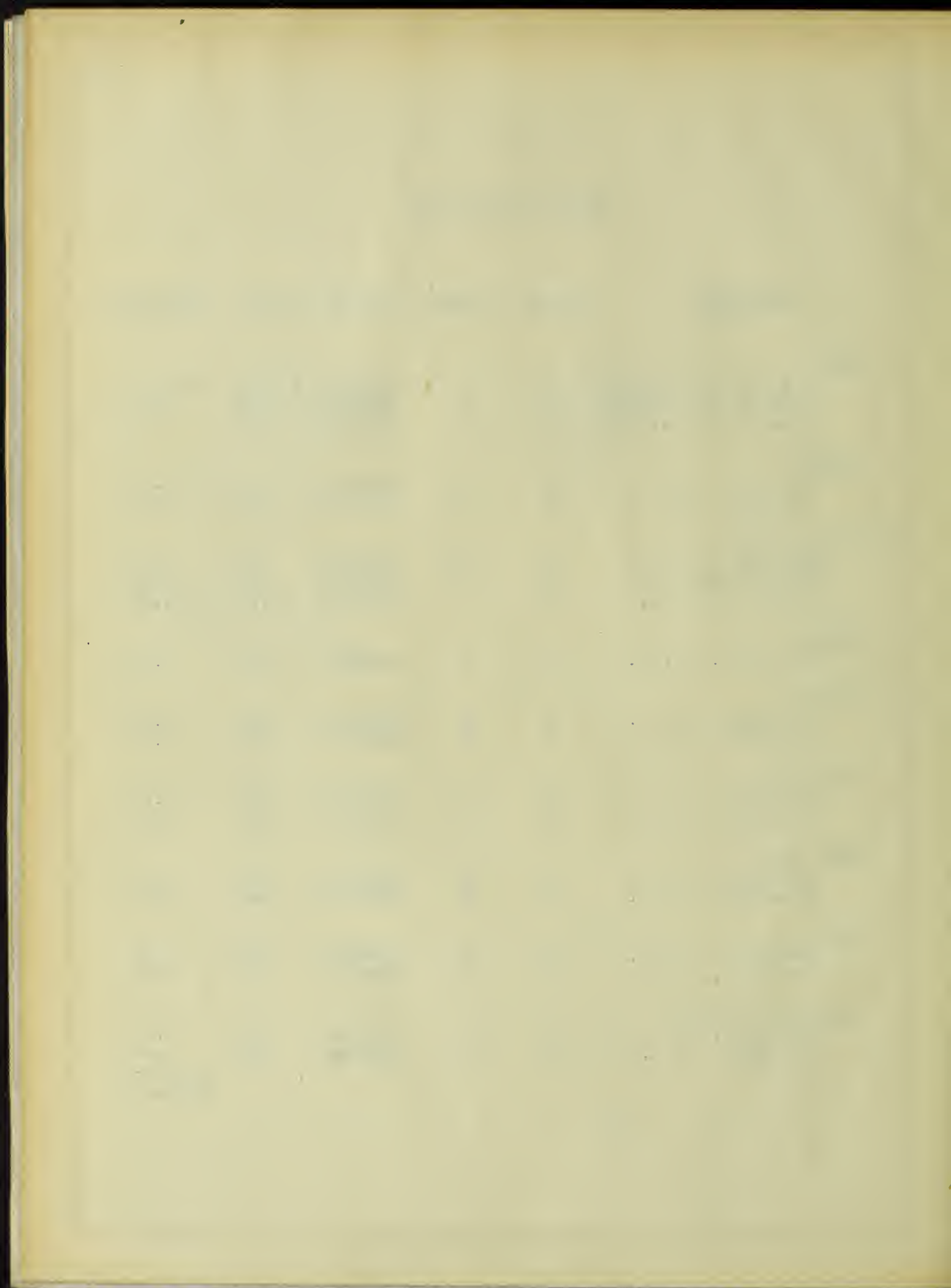
				\$98.21



INSTALLATION NO.3.

FIXTURES	AMOUNT	LIGHTS	CAT.NO.	PRICE	EXTENSION
Hall					
1'st floor ceiling	1	1	34E5269	\$ 8.75	\$ 8.75
1'st floor bracket	2	2	34E5102	3.00	6.00
2'nd floor ceiling	1	1	34E7008	.75	.75
Parlor					
Ceiling	1	5	34E8515	29.75	29.75
Bracket	3	3	34E5110	6.80	20.40
Dining Room					
Ceiling	4	4	34E6508	.28	1.12
Side Board	2	2	34E6508	.28	.56
Dome	1	1	34E8527	19.00	19.00
Pantry					
Ceiling	1	1	34E5277	2.45	2.45
Kitchen					
Ceiling	1	1	34E5242	1.40	1.40
Bracket	2	2	34E5070	1.40	2.80
Bed Room					
Ceiling	5	5	34E5277	2.45	12.25
Bracket	6	6	34E5070	1.40	8.40
Bath Room					
Ceiling	1	1	34E7008	.75	.75
Bracket	2	2	34E5070	1.40	2.80
Porch					
Bracket	1	1	34E5102	3.00	3.00
Ceiling	3	3	34E7008	.75	2.25
Basement & Attic					
Ceiling	5	5	34E7012	.45	2.25
Bracket	1	1	34E7012	.45	.45

					\$125.13



SEVEN ROOM HOUSE

T O T A L C O S T S

INSTALLATION NO.1.

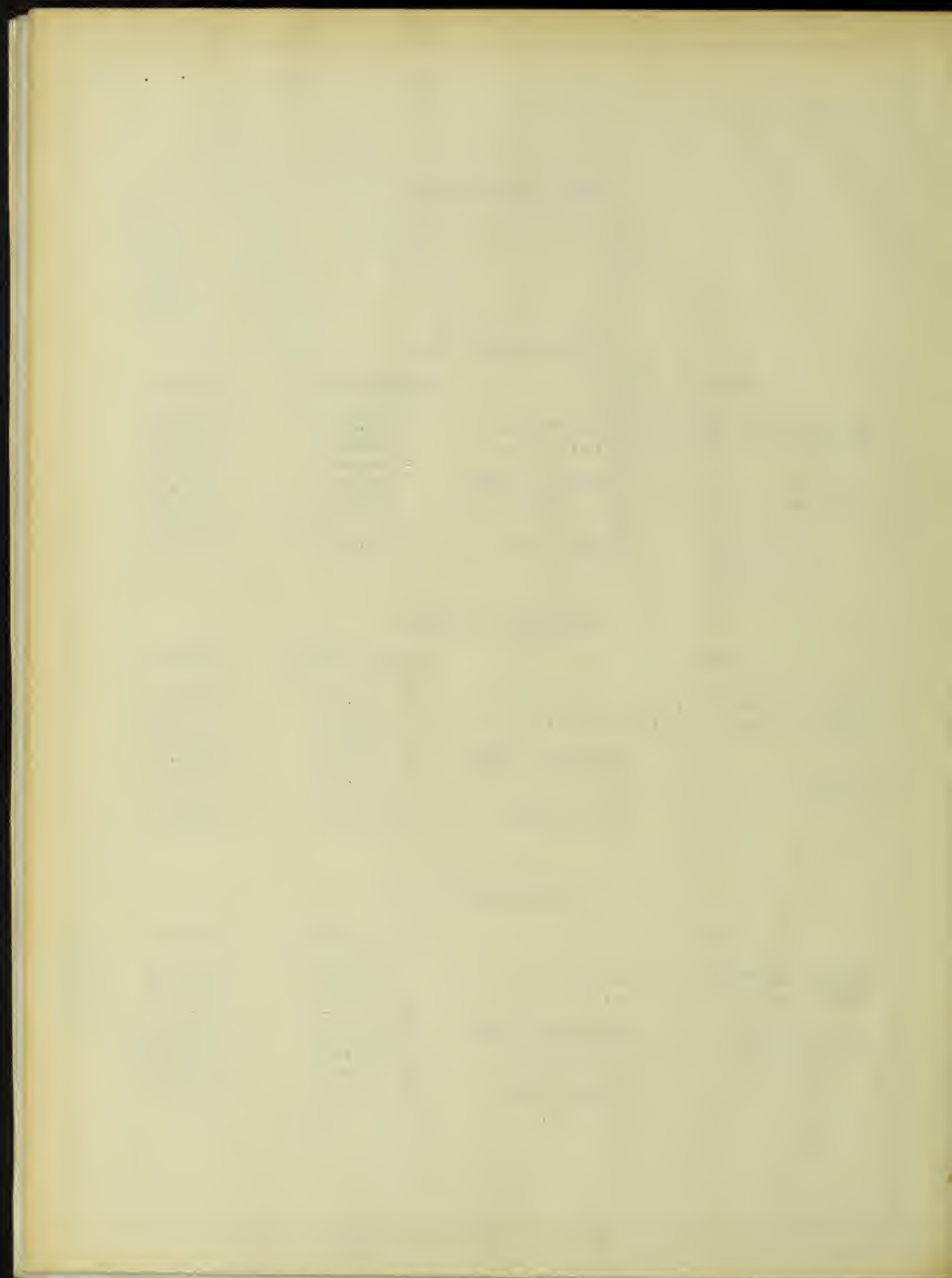
Items.	Knob & Tube	Conduit
Wiring Material	\$ 19.88	\$ 45.96
Labor	29.58	57.75
	-----	-----
Combined Cost	49.46	103.71
Fixtures	19.15	19.15
	-----	-----
Total Cost ..	\$ 68.61	\$122.86

INSTALLATION NO.2.

Items	Knob & Tube	Conduit
Wiring Material	\$ 25.79	\$ 61.42
Labor	41.41	80.85
	-----	-----
Combined Cost	\$ 67.20	\$142.27
Fixtures	47.27	47.27
	-----	-----
Total Cost	\$ 114.47	\$189.54

INSTALLATION NO.3.

Items	Knob & Tube	Conduit
Wiring Material	\$ 39.94	\$ 98.21
Labor	61.69	120.45
	-----	-----
Combined Cost	\$ 101.63	\$ 218.66
Fixtures	125.13	125.13
	-----	-----
Total Cost	\$ 226.76	\$ 343.79



SEVEN ROOM HOUSE

L A M P S

CARBONS

TUNGSTENS

Amount	C.P.	Price	Extension	Amount	Watts	Price	Extension
--------	------	-------	-----------	--------	-------	-------	-----------

INSTALLATION NO.1.

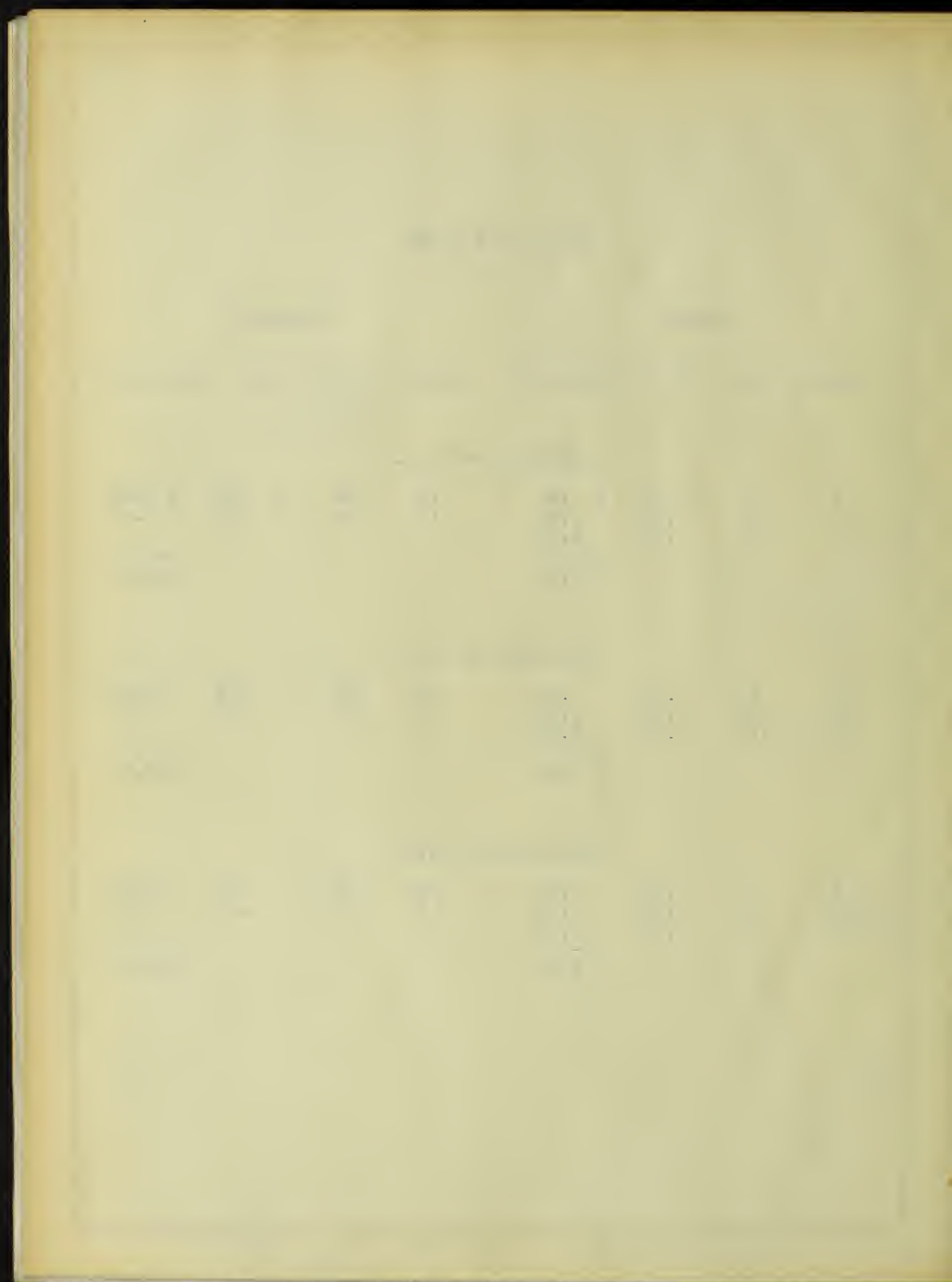
3	4	\$.15	\$.45	12	25	\$.53	\$ 6.36
9	8	.15	1.35	10	40	.60	6.00
10	16	.15	1.50				
			-----				-----
			\$ 3.30				\$12.36

INSTALLATION NO.2.

6	4	.15	.90	22	25	.53	11.66
16	8	.15	2.40	9	40	.60	5.40
9	16	.15	1.35				
			-----				-----
			\$ 4.65				\$17.06

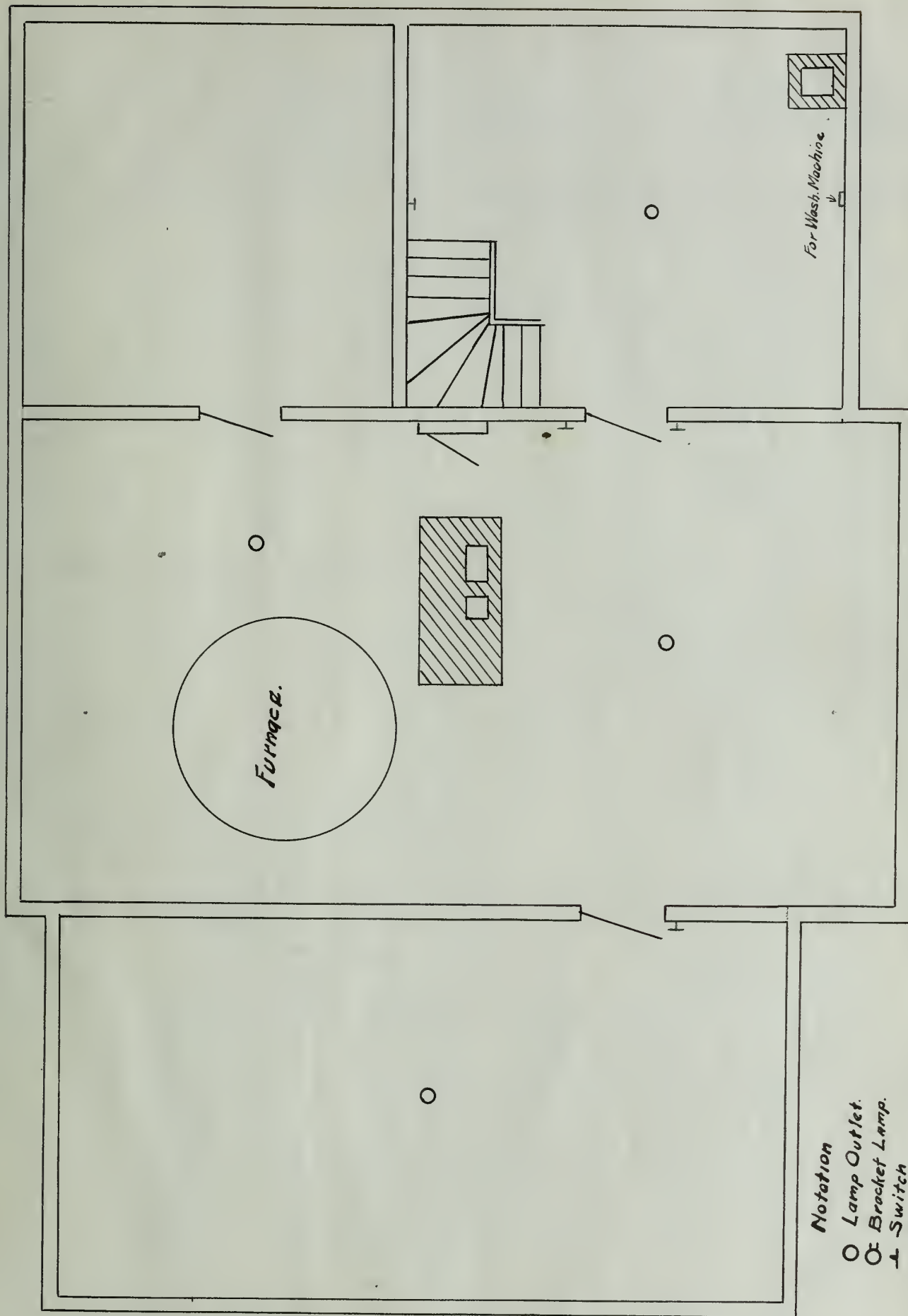
INSTALLATION NO.3.

8	4	.15	1.20	40	25	.53	21.20
32	8	.15	4.80	7	40	.60	4.20
7	16	.15	1.05				
			-----				-----
			\$ 7.05				\$25.40



DATA & PLANS
FOR AN
ELEVEN ROOM HOUSE

THE
LIBRARY OF THE
MUSEUM OF NATURAL HISTORY
AND
ZOOLOGY
OF THE
CITY OF BOSTON
1850



Notation

O Lamp Outlet.

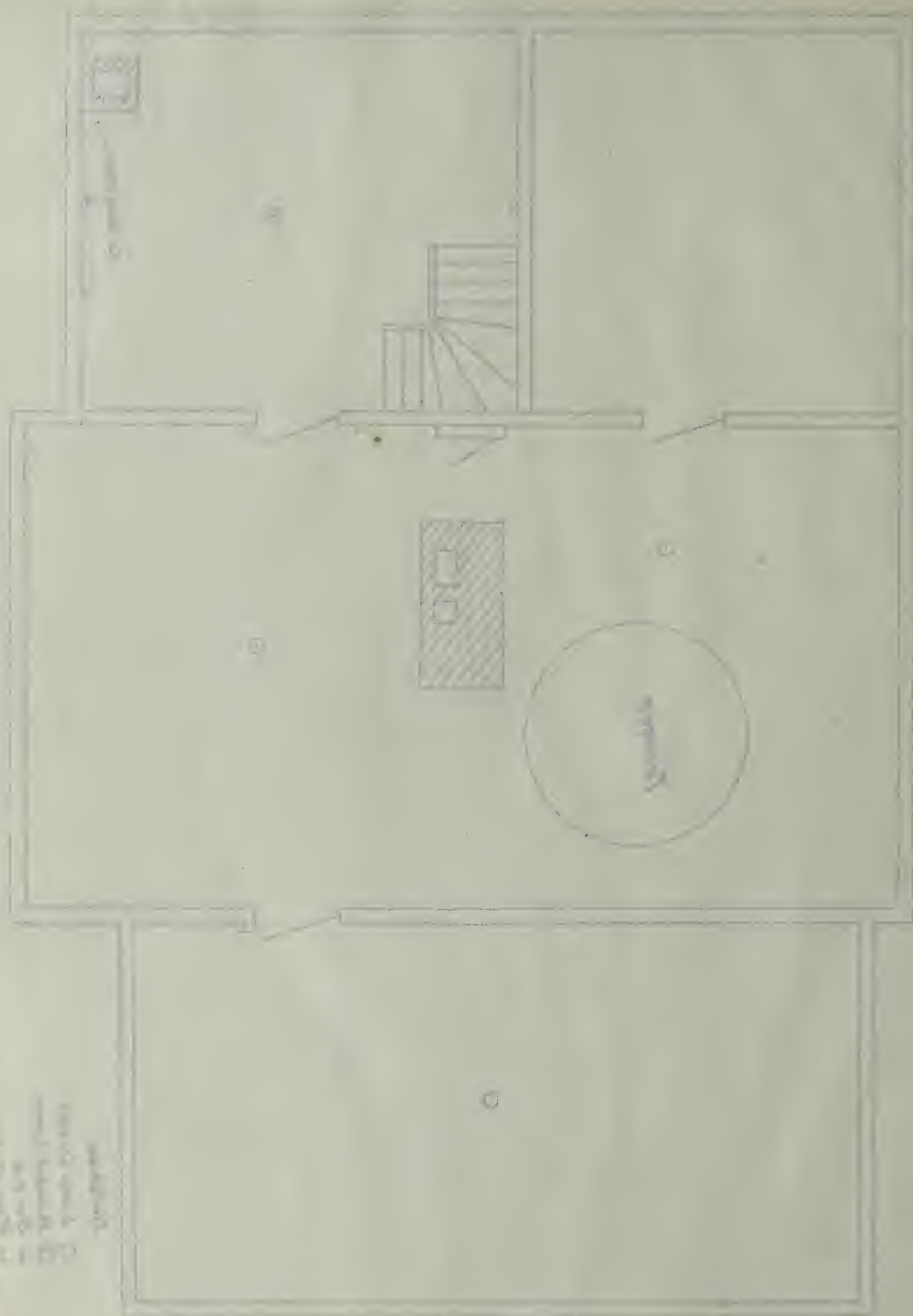
O- Bracket Lamp.

+ Switch

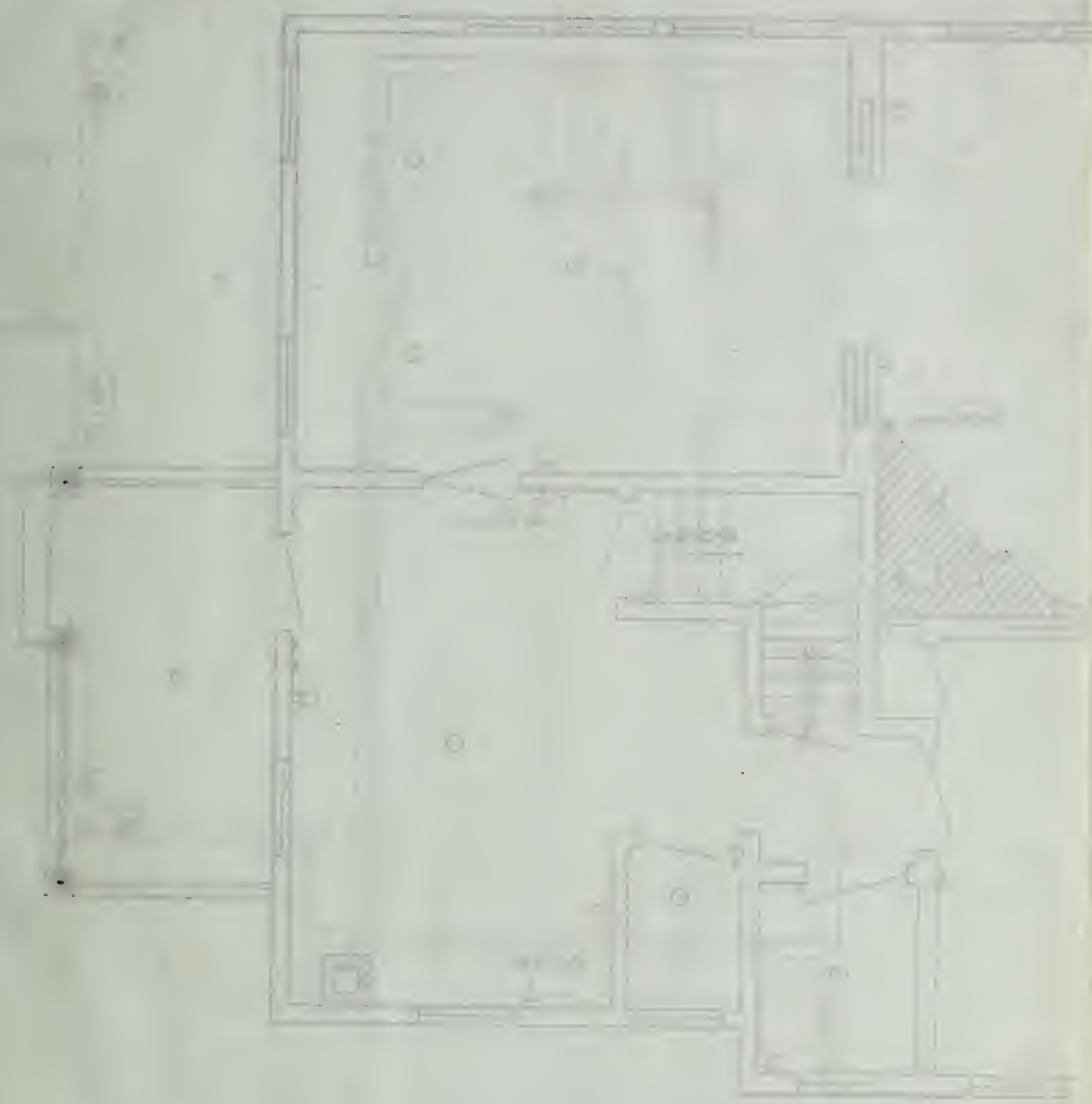
⌋ Plug Outlet

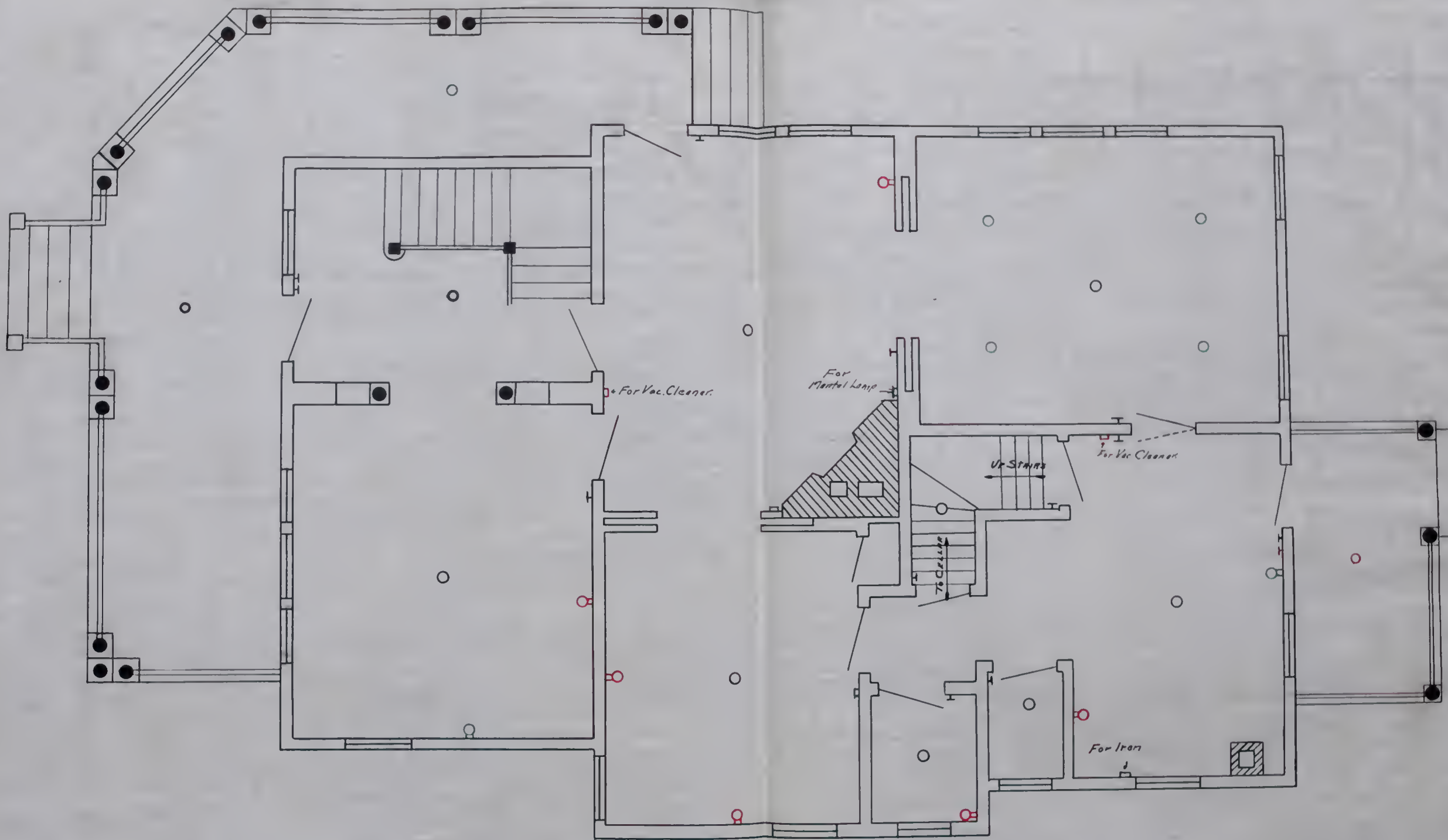
- Red = Additions To 1st Installation.

- Green= " " 2nd " "



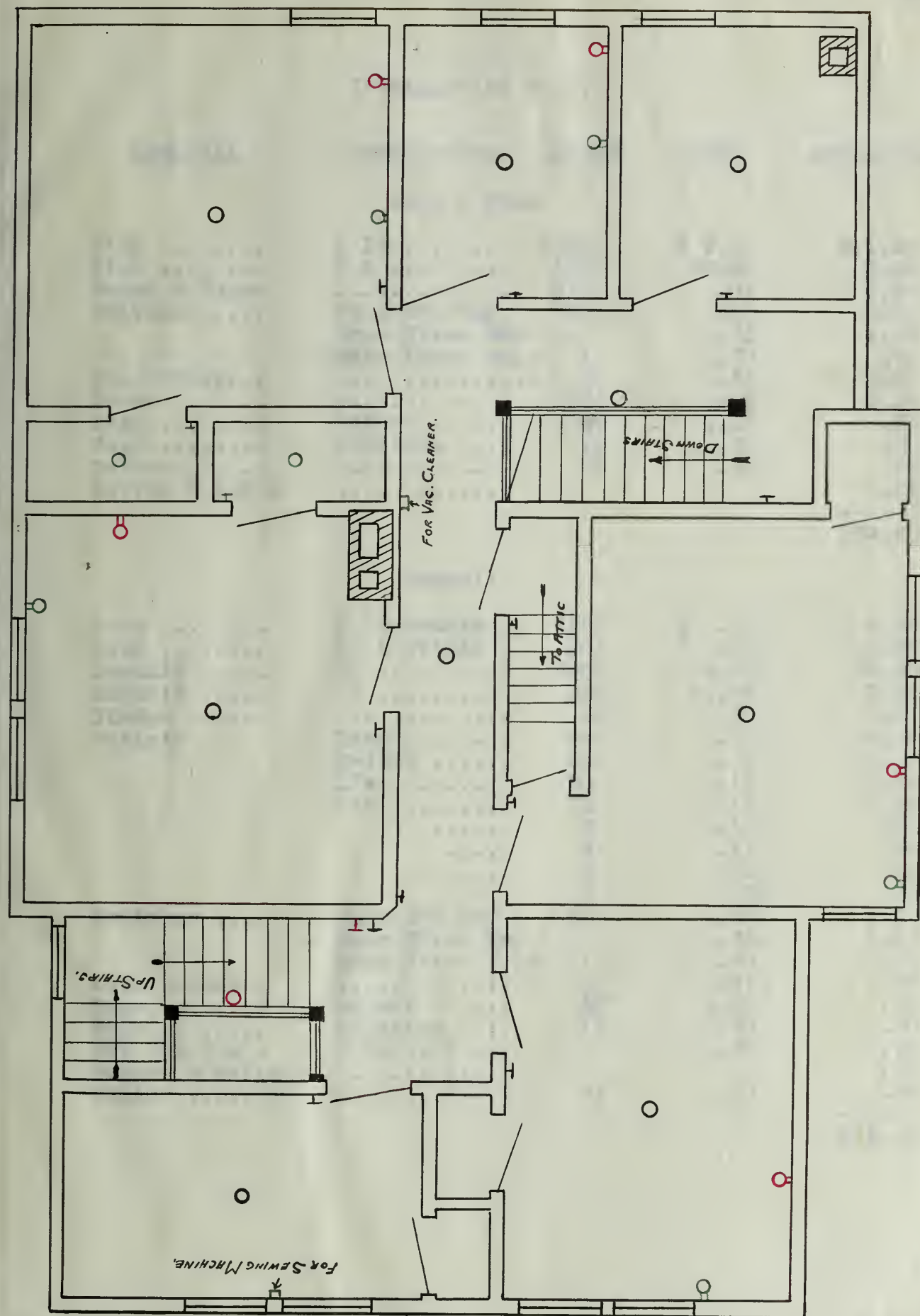
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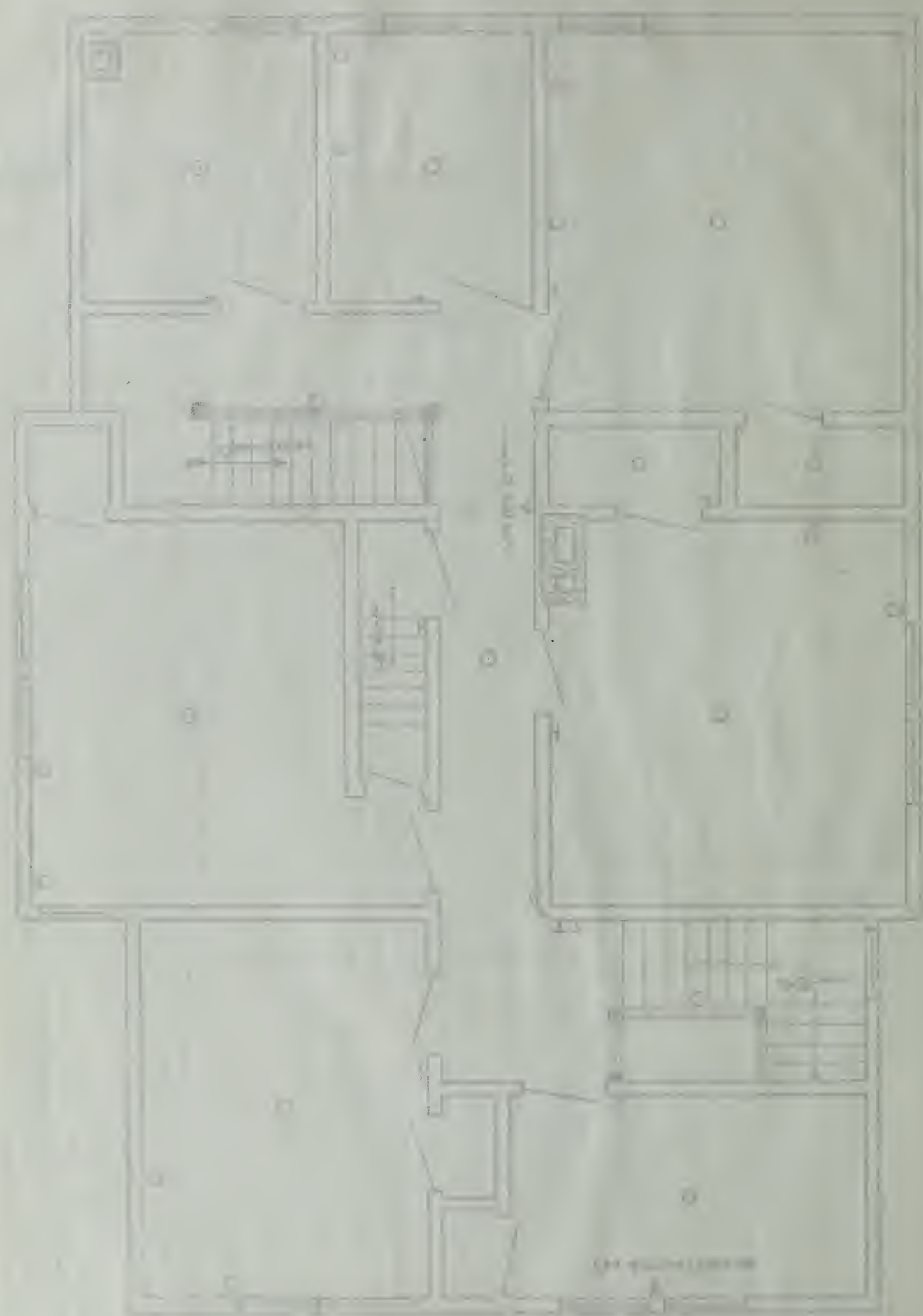




FIRST FLOOR.

SECOND FLOOR.





STAIRS

INSTALLATION NO. I.

MATERIAL	DESCRIPTION	AMOUNT	PRICE	EXTENSION
Knob & Tube				
Wire	# 14.....	1235'	\$ 9.00	\$11.20
Wire	# 8	105'	20.80	2.20
Knobs & Tubes	.....	930	.01	9.30
Switches	Snap Two Way	20	.20	4.00
	Snap Three Way	4	.35	1.40
	Main Three Pole	1	.70	.70
Fuse Blocks .	.....	5	.25	1.25
Loom .....	.....	50'	.05	2.50
Tape	Rubber	1#	1.00	.50
Tape	Friction	1#	.30	.30
Solder .....	.....	2#	.10	.20
Screws & Nails	.....			1.25

				\$34.80

Conduit				
Wire	# 14 Double..	620'	\$.01	\$ 6.20
Wire	# 8 Triple .	35'	.04	1.40
Conduit	1/2"	590'	6.08	35.90
Conduit	1"	35'	10.08	3.60
Clamps .....	.....	6#	.20	1.20
Outlets	Lamp	24	.18	4.30
	Switch	24	.18	4.32
	L's	20	.12	2.40
	T's	21	.12	3.78
	.....	3	.12	.36
	.....	4	.12	.48
	.....	3	.12	.36
	.....	1	.12	.12
Switches	Snap Two Way	20	.20	4.00
	Snap Three Way	4	.35	1.40
	Main Three Pole	1	.70	.70
Fuse Blocks .	.....	5	.25	1.25
Tape	Rubber	1#	1.00	.50
Tape	Friction	1#	.30	.30
Cut Out Box .	5 Circuit ...	1	1.90	1.90
Screws & Nails75
Solder	2#	.10	.20

				\$75.42

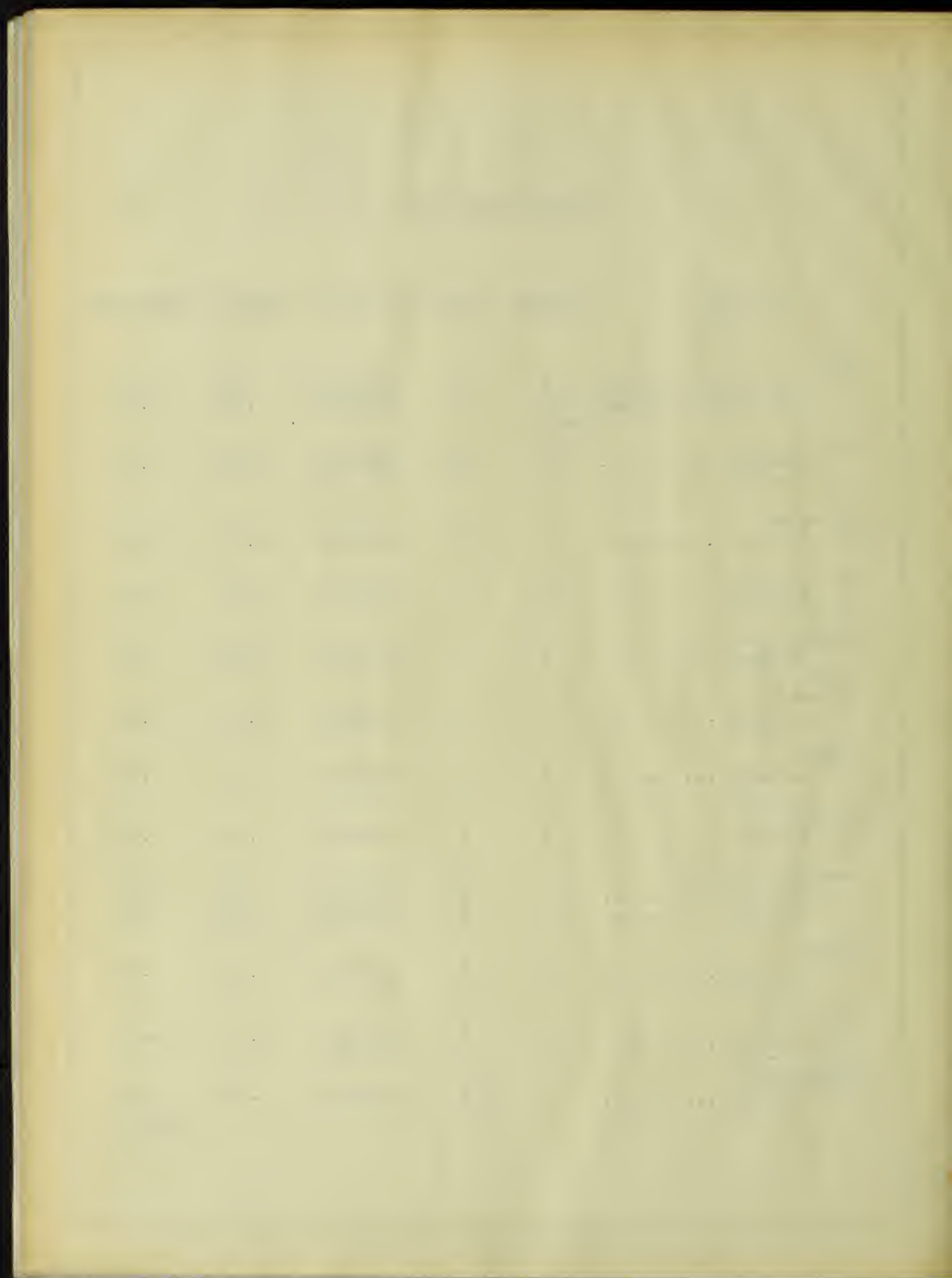
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INSTALLATION NO. I.

FIXTURES	AMOUNT	LIGHTS	CAT.NO.	PRICE	EXTENSION
Hall					
1'st floor ceiling	1	1	34E7008	\$.75	\$.75
2'nd floor ceiling	2	2	34E7008	.75	1.50
Parlor					
Pendant	1	3	34E5311	2.85	2.85
Bracket	0	0			
Library					
Pendant	1	3	34E5311	2.85	2.85
Living Room					
Pendant	1	3	34E5311	2.85	2.85
Dining Room					
Pendant	1	3	34E5202	1.20	1.20
Kitchen					
Pendant	1	1	34E7554	1.40	1.40
Pantry					
Pendant	1	1	34E5200	.85	.85
Toilet					
Pendant	1	1	34E7008	.75	.75
Basement & Attic					
Ceiling	5	5	34E6500	.23	1.15
Bracket	1	1	34E6506	.30	.30
Porch					
Ceiling	1	1	34E7008	.75	.75
Bed Room					
Pendant	6	6	34E7554	1.40	8.40
Bath Room					
Pendant	1	1	34E7008	.75	.75

					\$26.35

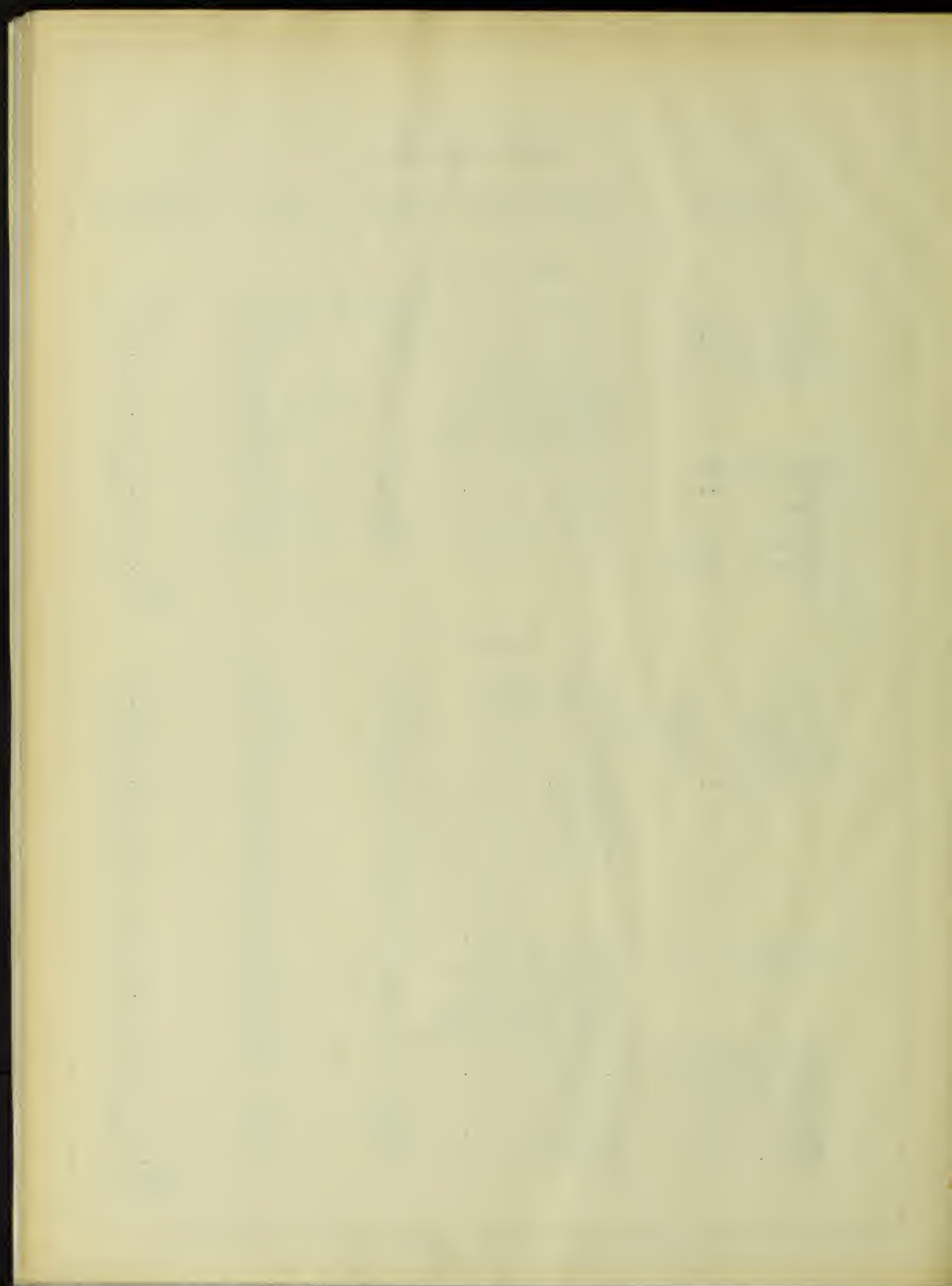


INSTALLATION NO.2.

MATERIAL	DESCRIPTION	AMOUNT	PRICE	EXTENSION
Knob and Tube				
Wire	# 14	1615'	\$ 9.00	\$14.50
Wire	# 8	105'	21.00	22.05
Knobs & Tubes	.....	1210	.01	12.10
Switches	Snap Two Way	12	.20	2.40
	Snap Three Way	2	.35	.70
	Push Two Way	8	.50	4.00
	Push Three Way	2	.63	1.26
	Main Three Pole	1	.70	.70
Fuse Blocks	.....	5	.25	1.25
Loom .....	.....	65'	.05	3.25
Tape	Rubber	$\frac{3}{4}$ "	1.00	.75
Tape	Friction	$1\frac{1}{4}$ "	.30	.40
Solder .....	.....	$2\frac{1}{2}$ "	.10	.25
Screws & Nails	.....			1.50

				\$65.11
Conduit				
Wire	# 14 Double .	808'	\$.01	\$ 8.08
Wire	# 8 Triple .	35'	.04	1.40
Conduit	$\frac{1}{2}$ "	665'	6.08	40.50
Conduit	1"	35'	10.08	3.60
Clamps .....	.....	8#	.20	1.60
Outlets	Lamp	37	.18	6.70
	Switch	24	.18	4.30
	Plug	2	.18	.36
	L's	32	.12	3.84
	T's	31	.12	3.72
	.....	3	.12	.36
	.....	4	.12	.48
	.....	3	.12	.36
	.....	2	.12	.24
Switches	Snap Two Way	12	.20	2.40
	Snap Three Way	2	.35	.70
	Push Two Way	8	.50	4.00
	Push Three Way	2	.63	1.26
	Main Three Pole	1	.70	.70
Plugs & Plates	.....	2	.50	1.00
Cut Out Box	.....	1	1.90	1.90
Screws & Nails	.....			.75
Solder .....	.....	$2\frac{1}{2}$ "	.10	.25
Tape	Rubber	$\frac{3}{4}$ "	1.00	.75
Tape	Friction	$1\frac{1}{4}$ "	.30	.40

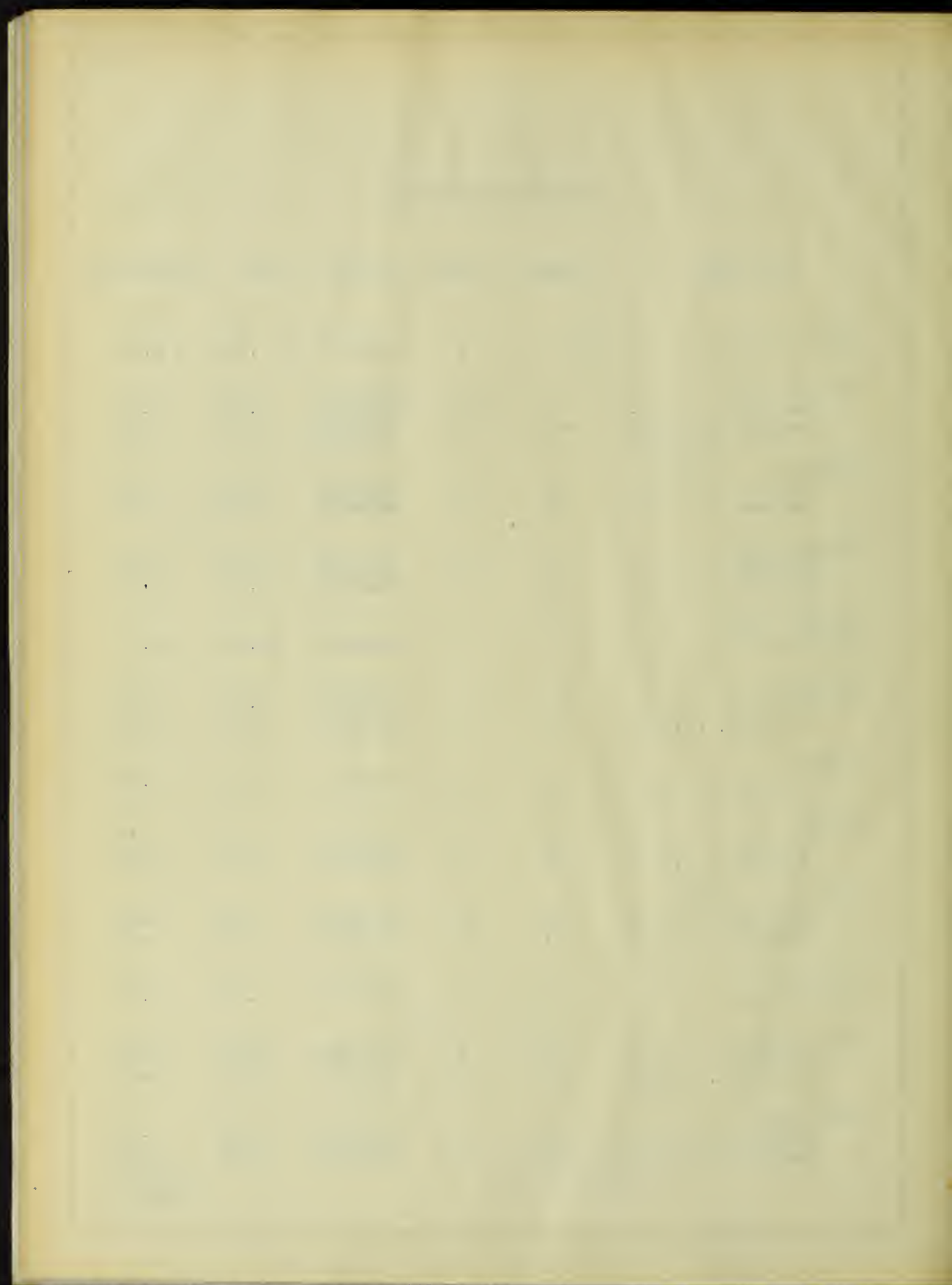
				\$89.65



INSTALLATION NO.2.

FIXTURES	AMOUNT	LIGHTS	CAT.NO.	PRICE	EXTENSION
Hall					
Ceiling	4	4	34E7008	\$.75	\$ 3.00
Parlor					
Pendant	1	4	34E5329	7.90	7.90
Bracket	1	1	34E5050	1.00	1.00
Library					
Pendant	1	4	34E5329	7.90	7.90
Bracket	2	2	34E5050	1.00	2.00
Living Room					
Pendant	1	4	34E5329	7.90	7.90
Bracket	1	1	34E5050	1.00	1.00
Dining Room					
Pendant	1	1	34E5254	21.75	21.75
Kitchen					
Pendant	1	1	34E7558	1.60	1.60
Bracket	1	1	34E5050	1.00	1.00
Pantry					
Pendant	1	1	34E5204	1.20	1.20
Toilet					
Pendant	1	1	34E7008	.75	.75
Bracket	1	1	34E5050	1.00	1.00
Basement & Attic					
Ceiling	5	5	34E6500	.23	1.15
Bracket	1	1	34E6506	.30	.30
Porch					
Ceiling	2	2	34E7008	.75	1.50
Bed Room					
Pendant	6	6	34E7558	1.60	9.60
Bracket	5	5	34E5050	1.00	5.00
Bath Room					
Pendant	1	1	34E7008	.75	.75
Bracket	1	1	34E5050	1.00	1.00

					\$77.30

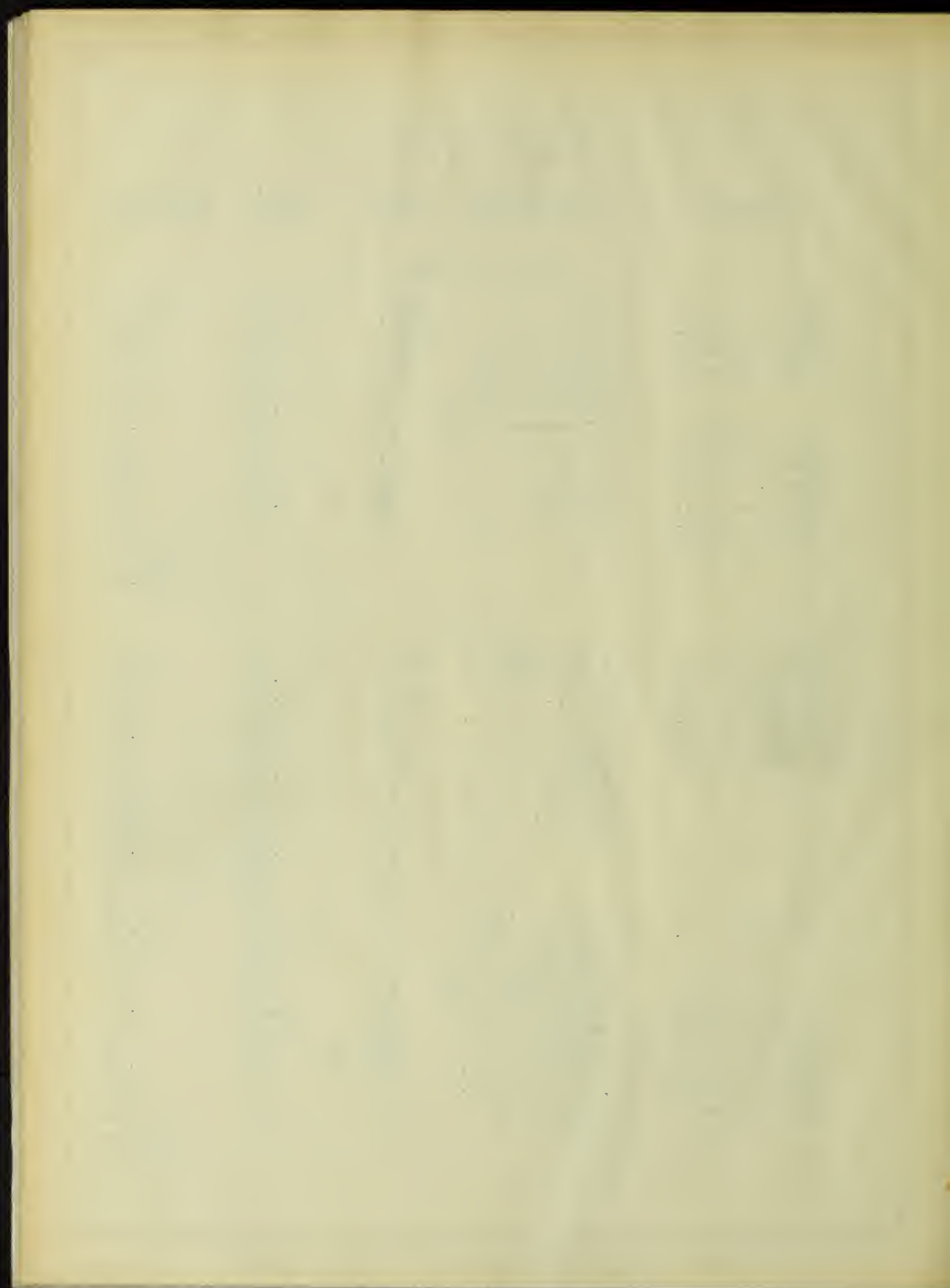


INSTALLATION NO.3.

MATERIAL	DESCRIPTION	AMOUNT	PRICE	EXTENSION
Knob and Tube				
Wire	# 14	2047'	\$ 9.00	\$18.50
Wire	# 8	105'	21.00	2.20
Knobs & Tubes	.....	1540	.01	15.40
Switches	Snap Two Way	6	.20	1.20
	Push Two Way	20	.50	10.00
	Push Three Way	4	.63	2.54
	Main Three Pole	1	.70	.70
Fuse Blocks..	.....	5	.25	1.25
Loom .....	.....	87'	.05	4.35
Tape	Rubber	1#	1.00	1.00
Tape	Friction	1 $\frac{1}{2}$ #	.30	.45
Solder .....	.....	2 $\frac{1}{2}$ #	.10	.25
Screws & Nails	.....			1.75

				\$59.59
Conduit				
Wire	# 14 Double..	1025	\$.01	\$10.25
Wire	# 8 Triple .	35	.04	1.40
Conduit	$\frac{1}{2}$ "	886'	6.08	53.90
Conduit	1"	35'	10.08	3.60
Clamps .....	.....	10#	.20	2.00
Outlets	Lamp	53	.18	9.54
	Switch	30	.18	5.40
	Plug	7	.18	1.26
	L's	51	.12	6.12
	T's	43	.12	5.16
	.....	3	.12	.36
	.....	4	.12	.48
	.....	3	.12	.36
	.....	3	.12	.36
Switches	Snap Two Way	6	.20	1.20
	Push Two Way	20	.50	10.00
	Push Three Way	4	.35	1.40
	Main Three Pole	1	.70	.70
Plugs & Plates	Plugs & Plates	6	.50	3.00
Tape	Rubber	1#	1.00	1.00
Tape	Friction	1 $\frac{1}{2}$ #	.30	.45
Solder .....	.....	2 $\frac{1}{2}$ #	.10	.25
Screws & Nails	.....			1.00
Cut Out Box .	5 Circuits	1	1.90	1.90

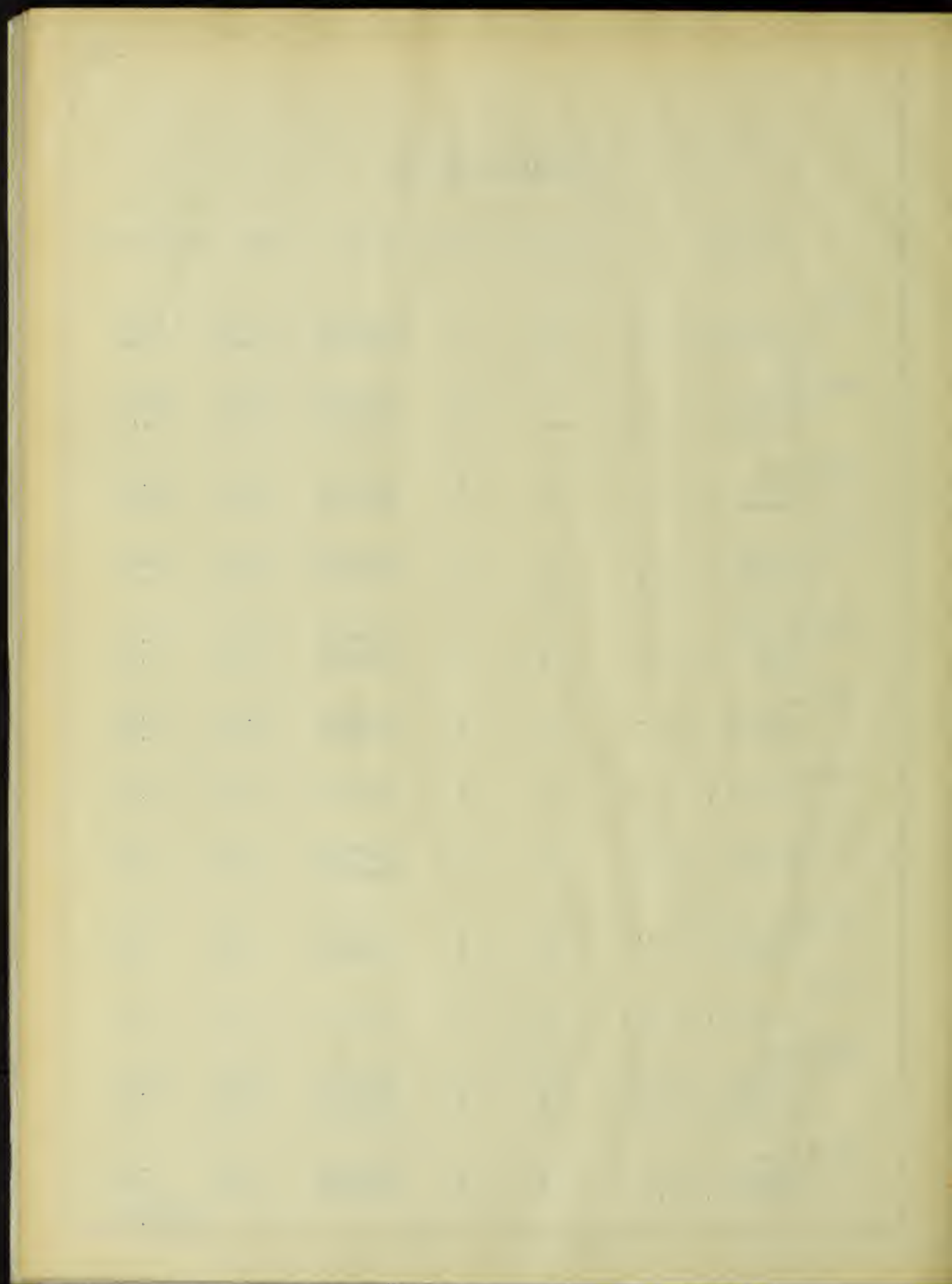
				\$121.09



INSTALLATION NO.3.

FIXTURES	AMOUNT	LIGHTS	CAT.NO.	PRICE	EXTENSION
Hall					
Ceiling	3	3	34E7008	\$.75	\$ 2.25
1'st floor	1	1	34E5242	1.40	1.40
Parlor					
Pendant	1	5	34E8518	32.00	32.00
Bracket	2	2	34E5110	6.80	13.60
Library					
Pendant	1	5	34E8518	32.00	32.00
Bracket	2	2	34E5110	6.80	13.60
Living Room					
Pendant	1	5	34E8518	32.00	32.00
Bracket	1	1	34E5110	6.80	6.80
Dining Room					
Pendant	1	3	34E8527	19.00	19.00
Studs	4	4	34E6508	.30	1.20
Kitchen					
Pendant	1	1	34E5244	3.35	3.35
Bracket	2	2	34E5070	1.40	2.80
Pantry					
Pendant	1	1	34E5204	1.20	1.20
Toilet					
Pendant	1	1	34E7008	.75	.75
Bracket	1	1	34E5050	1.00	1.00
Basement & Attic					
Ceiling	5	5	34E6500	.23	1.15
Bracket	1	1	34E6506	.30	.30
Porch					
Ceiling	3	3	34E7008	.75	2.25
Bed Room					
Pendant	6	6	34E5277	2.45	14.70
Bracket	8	8	34E5070	1.40	11.20
Closet	2	2	34E6500	.25	.50
Bath Room					
Pendant	1	1	34E7008	.75	.75
Bracket	2	2	34E5050	1.00	2.00

					\$195.80



ELEVEN ROOM HOUSE

T O T A L C O S T S

INSTALLATION NO.1.

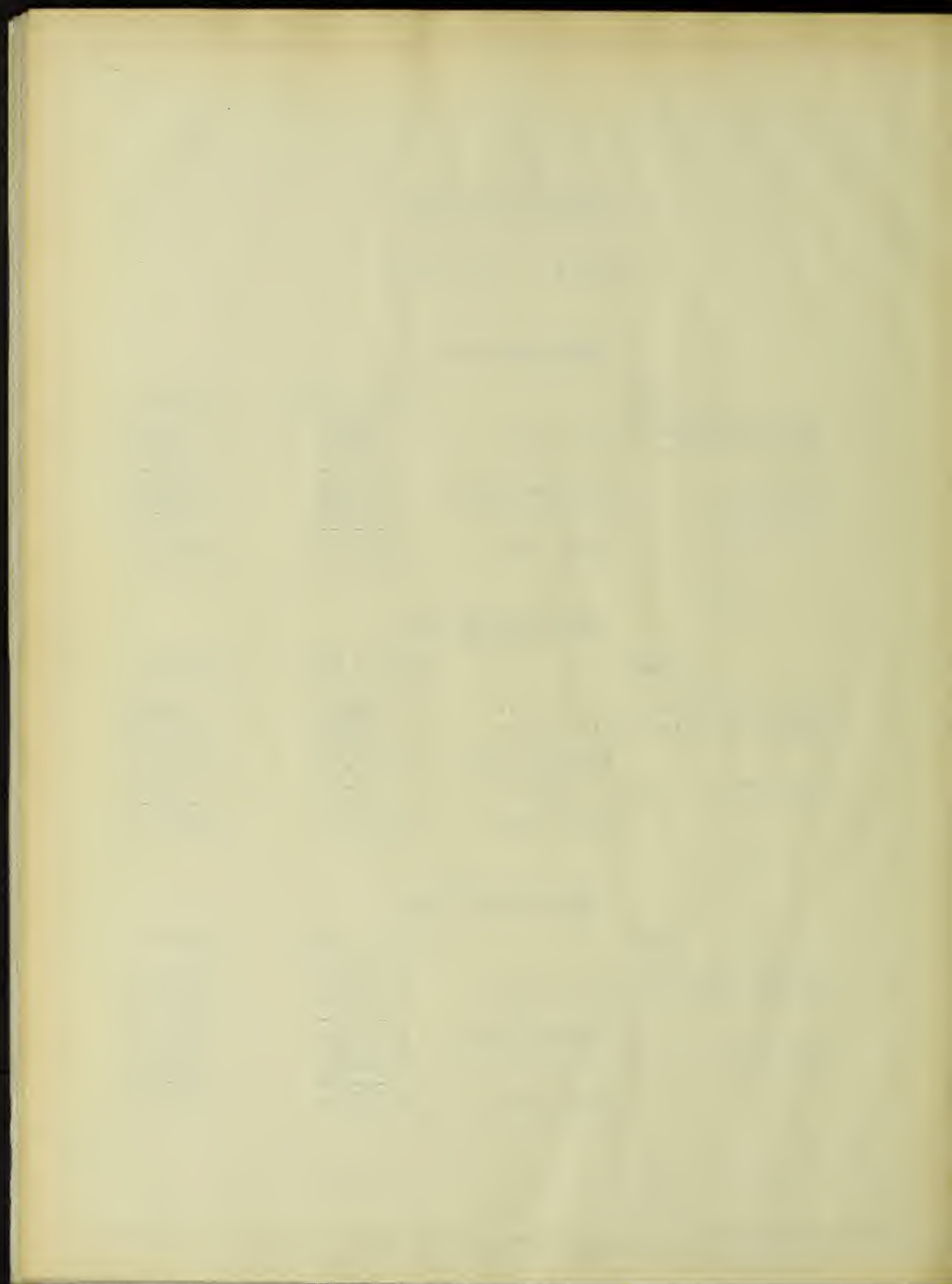
Items	Knob & Tube	Conduit
Wiring Material	\$ 34.80	\$ 75.42
Labor	40.56	79.20
	-----	-----
Combined Cost	\$ 75.36	\$ 154.62
Fixtures	26.35	26.35
	-----	-----
Total Cost	\$ 101.71	\$ 180.97

INSTALLATION NO.2.

Items	Knob & Tube	Conduit
Wiring Material	\$ 65.11	\$ 89.65
Labor	53.24	103.95
	-----	-----
Combined Cost	\$ 118.35	\$ 193.60
Fixtures	77.30	77.30
	-----	-----
Total Cost	\$ 195.65	\$ 270.90

INSTALLATION NO.3.

Items	Knob & Tube	Conduit
Wiring Materials	\$ 59.59	\$ 121.09
Labor	76.05	148.50
	-----	-----
Combined Cost	\$ 135.64	\$ 269.59
Fixtures	195.80	195.80
	-----	-----
Total Cost	\$ 331.44	\$ 465.39



ELEVEN ROOM HOUSE

CARBONS

TUNGSTENS

Amount	C.P.	Price	Extension	Amount	Watts	Price	Extension
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INSTALLATION NO.1.

3	4	\$.15	\$.45	16	25	\$.53	\$ 8.48
13	8	.15	1.95	16	40	.60	9.60
16	16	.15	2.40				
			-----				-----
			4.80				\$18.08

INSTALLATION NO.2.

2	4	.15	.30	30	25	.53	15.95
28	8	.15	4.20	16	40	.60	9.60
16	16	.15	2.40	1	60	.84	.84
1	32	.22	.22				
			-----				-----
			\$ 7.12				\$26.34

INSTALLATION NO.3.

9	4	.15	1.35	54	25	.53	28.62
45	8	.15	6.75	11	40	.60	6.60
11	16	.15	1.65				
			-----				-----
			\$ 9.75				\$35.22





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